MultiRAE MX

User's Guide

RAE SYSTEMS by Honeywell

Rev A
October 2014
P/N: M01-4035-000

Product Registration

Register your product online by visiting:

http://www.raesystems.com/support/product-registration

By registering your product, you can:

- Receive notification of product upgrades or enhancements
- Be alerted to Training classes in your area
- Take advantage of RAE Systems special offers and promotions

© 2014 RAE Systems by Honeywell

Contents

1.1 Proper Product Disposal At End Of Life 6
2 Standard Contents 7
3 General Information 8
3.1 Standard Sensor Configuration 8
3.2 Key Features 9
4 User Interface 10
4.1 Display Overview 10
4.1.1 Status Indicator Icons 10
4.1.2 LCD Flip 11
4.1.3 Keys & Interface 11
4.2 Screen Display For Various Numbers Of Active Sensors 12
4.3 Menus 13
5 Wireless Control And Submenus 16
6 Battery 17
6.1 Using The Travel Charger 18
6.2 Replacing A Battery 19
6.3 Battery States 20
6.4 Alkaline Battery Pack 20
7 Turning The MultiRAE MX On And Off 21
7.1 Turning The MultiRAE MX On 21
7.2 Turning The MultiRAE MX Off 21
7.3 Testing Alarm Indicators 22
7.4 Pump Status 22
7.5 Calibration Status 22
7.6 Bump Status 23
8 Modes Of Operation 24
8.1 Hygiene Operation Mode 24
8.2 Search Operation Mode 24
8.3 Basic User Mode 24
8.4 Advanced User Mode 24
9 Programming 24
9.1 Enter Programming In Advanced Mode 24
9.2 Enter Programming In Basic Mode 25
9.3 Menus And Submenus 26
9.3.1 Editing And Selecting Parameters And Sensors 26
9.3.2 Calibration 27
9.3.2.1 Fresh Air 27
9.3.2.2 Multi Sensor Span 28
9.3.2.3 Single Sensor Zero 28
9.3.2.4 Single Sensor Span 29
9.3.2.5 Multi Sensor Bump 30
9.3.2.6 Single Sensor Bump 32
9.3.2.7 Cal. Reference 33
9.3.2.8 Change Cal. Gas 33
9.3.2.9 Multi Cal Select 33
9.3.2.10 Change Span Value 34
9.3.3 Measurement 35
9.3.3.1 Sensor On/Off 35
9.3.3.2 Change Meas. Gas 35

9.3.3.3 Measurement Units 36
9.3.4 Alarms 37
9.3.4.1 Alarm Limits 37
9.3.4.2 Alarm Mode 37
9.3.4.3 Alarm Settings 38
9.3.4.4 Comfort Beep 38
9.3.4.5 Man Down Alarm 38
9.3.5 Datalog 39
9.3.5.1 Clear Datalog 39
9.3.5.2 Datalog Interval 40
9.3.5.3 Sensor Selection 40
9.3.5.4 Data Selection 40
9.3.5.5 Datalog Type 40
9.3.5.6 Memory Full Action 41
9.3.6 Wireless 41
9.3.6.1 Radio ON/OFF 41
9.3.6.2 PAN ID 42
9.3.6.3 Channel 42
9.3.6.4 Join Network 42
9.3.6.5 Interval 43
9.3.6.6 Off Network Alarm 43
9.3.6.7 Factory Reset 44
9.3.7 Monitor 44
9.3.7.1 LCD Contrast 44
9.3.7.2 Operation Mode 45
9.3.7.3 Pump Speed 45
9.3.7.4 Zero At Start 45
9.3.7.5 Fast Startup 45
9.3.7.6 Temperature Units 45
9.3.7.7 Language 45
9.3.7.8 Site ID 45
9.3.7.9 User ID 46
9.3.7.10 Date Format 46
9.3.7.11 Date 46
9.3.7.12 Time Format 46
9.3.7.13 Time 46
9.3.7.14 User Mode 46
9.3.7.15 Backlight 46
9.3.7.16 LCD Flip 46
10 Policy Enforcement 47
10.1 Setting Policy Enforcement 47
10.1.1 Using The AutoRAE 2 Automatic Test And Calibration System 47
10.1.2 Using The MultiRAE MX Travel Charger 51
10.2 Deactivating Policy Enforcement 52
10.2.1 AutoRAE 2 Cradle 52
10.2.2 MultiRAE MX Travel Charger 52
11 Calibration And Testing 54
11.1 Manual Alarms Test 54
11.2 Bump Testing And Calibration 54
11.2.1 Flow Rate & Calilbration Adapter (Pumped) 54

11.2.2 MultiRAE MX Diffusion Model (No Pump) 55
11.2.3 Bump (Functional) Testing 56
11.3 Zero/Fresh Air Calibration 57
11.3.1 Fresh Air Calibration 58
11.3.2 Single-Sensor Zero Calibration 58
11.4 Span Calibration 59
11.4.1 Multi-Sensor Span Calibration 59
11.4.2 Single-Sensor Span Calibration 60
12 Datalog Transfer And Monitor Configuration 61
13 Downloading Datalogs And Performing PC-Based Instrument Configuration 61
14 Maintenance 62
14.1 Removing/Installing The Rubber Boot 62
14.2 Replacing The Filter(s) 63
14.3 Replacing The Gas Inlet Adapter (Pumped Versions Only) 63
14.4 Removing/Cleaning/Replacing Sensor Modules 63
14.5 Replacing The Pump 64
15 Alarms Overview 65
15.1 Alarm Signals 65
15.2 Changing The Alarm Mode 65
15.3 Alarm Signal Summary 66
16 Troubleshooting 69
17 Diagnostic Mode 70
17.1 Entering Diagnostic Mode 70
17.2 Exiting Diagnostic Mode 70
17.3 Navigating Diagnostic Mode 70
18 Specifications 72
18.1 Sensor Specifications 74
18.2 Range, Resolution & Response Time 75
18.3 LEL Correction Factors 75
19 Technical Support 78
20 RAE Systems Contacts 79

⚠ WARNINGS ⚠

Read Before Operating

This manual must be carefully read by all individuals who have or will have the responsibility of using, maintaining, or servicing this product. The product will perform as designed only if it is used, maintained, and serviced in accordance with the manufacturer's instructions.

CAUTION!

Never operate the monitor when the cover is removed. Remove the monitor rear cover or battery only in an area known to be non-hazardous.

ANY RAPID UP-SCALE READING FOLLOWED BY A DECLINING OR ERRATIC READING MAY INDICATE A GAS CONCENTRATION BEYOND UPPER SCALE LIMIT, WHICH MAY BE HAZARDOUS.

TOUTE LECTURE RAPIDE ET POSITIVE, SUIVIE D'UNE BAISSE SUBITE AU ERRATIQUE DE LA VALEUR, PEUT INDIQUER UNE CONCENTRATION DE GAZ HORS GAMME DE DÉTECTION QUI PEUT ÊTRE DANGEREUSE

ONLY THE COMBUSTIBLE GAS DETECTION PORTION OF THIS INSTRUMENT HAS BEEN ASSESSED FOR PERFORMANCE.

UNIQUMENT, LA PORTION POUR DÉTECTOR LES GAZ COMBUSTIBLES DE CET INSTRUMENT A ÉTÉ ÉVALUÉE.

CAUTION: BEFORE EACH DAY'S USAGE, SENSITIVITY OF THE LEL SENSOR MUST BE TESTED ON A KNOWN CONCENTRATION OF METHANE GAS EQUIVALENT TO 20 TO 50% OF FULL-SCALE CONCENTRATION. ACCURACY MUST BE WITHIN 0 AND +20% OF ACTUAL. ACCURACY MAY BE CORRECTED BY CALIBRATION PROCEDURE.

ATTENTION: AVANT CHAQUE UTILISATION JOURNALIERE, VERIFIER LA SENSIBILITE DU CAPTEUR DE LIE AVEC UNE CONCENTRATION CONNUE DE METHANE EQUIVALENTE DE 20 A 50% DE LA PLEINE ECHELLE. LA PRECISION DOIT ETRE COMPRISE ENTRE 0 ET 20% DE LA VALEUR VRAIE ET PEUT ETRE CORRIGEE PAR UNE PROCEDURE D'ETALONNAGE.

CAUTION: HIGH OFF-SCALE READINGS MAY INDICATE AN EXPLOSIVE CONCENTRATION.

ATTENTION: DES LECTURES HAUTES ET HORS D'ECHELLE PEUVENT INDIQUER DES CONCENTRATIONS DE GAZ INFLAMMABLES

CAUTION: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.

Note: Users are recommended to refer to ISA-RP12.13, Part II-1987 for general information on installation, operation, and maintenance of combustible gas detection instruments.

The MultiRAE MX multi-gas detector must be calibrated if it does not pass a bump test, or at least once every 180 days, depending on use and sensor exposure to poisons and contaminants.

SPECIAL CONDITIONS FOR SAFE USE

1. The PGM-6268X shall only be fitted with RAE Systems Rechargeable Battery Pack type M01-3055-000 or M01-3053-000 or Battery Adapter M01-3054-000 fitted with Duracell MN1500 batteries.
2. The PGM-6268X shall only be charged outside hazardous areas.
3. No precautions against electrostatic discharge are necessary for portable equipment that has an enclosure made of plastic, metal, or a combination of the two, except where a significant static-generating mechanism has been identified. Activities such as placing the item in a pocket or on a belt, operating a keypad or cleaning with a damp cloth, do not present a significant electrostatic risk. However, where a static-generating mechanism is identified, such as repeated brushing against clothing, then suitable precautions shall be taken, e.g., the use of anti-static footwear.

The model PGM-6268X is certified according to the IECEx scheme, ATEX and cCSAus (for US and Canada). PGM-6268X is intrinsically safe and may be used in hazardous locations. SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.

CAUTION!

This instrument has not been tested in an explosive gas/air atmosphere having an oxygen concentration greater than 21%. Substitution of components may impair suitability for intrinsic safety. Recharge batteries only in non-hazardous locations. Do not connect the serial communication port in a hazardous location.

MARKING

The product is marked with the following information:

RAE SYSTEMS
3775 N. 1st. St., San Jose
CA 95134, USA

Type PGM-6268X
Serial No./matrix: MXXXXXXXXX

IECEx SIR 11.0069X, Ex ia d IIC T4 Gb	CE 0575 SIRA 11ATEX2152X Ex II 2G Ex ia d IIC T4 Gb	c SP us Exia Cl I, Dv 1 Gr. A, B, C, D, T4 C22.2 No 152-1984 ISA-12.13.01-2000

Warnings: Understand manual first before operating.
Do not change batteries in hazardous location.
Do not mix old/new or different type of batteries.

Use only RAE Systems battery pack, PN: M01-3053-000, M01-3055-000, or M01-3054-000.
Um: 20V
-20º C ≤ Tamb ≤ +50º C

FCC Part 15 Statement

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Operation Area and Conditions

Hazardous Areas classified by Zones

PGM-6268X are intended to be used in hazardous areas zone 1 or zone 2, within the temperature range of -20º C to +50º C, where gases of explosion groups IIA, IIB or IIC and T4 may be present.

Hazardous Areas classified by Divisions

PGM-6268X are intended to be used in hazardous areas classified for Class I Div. 1 or 2, within the temperature range of -20º C to +50º C, where gases of explosion groups A, B, C or D and temperature class T4 may be present.

1.1 Proper Product Disposal At End Of Life

The Waste Electrical and Electronic Equipment (WEEE) directive (2002/96/EC) is intended to promote recycling of electrical and electronic equipment and their components at end of life. This symbol (crossed-out wheeled bin) indicates separate collection of waste electrical and electronic equipment in the EU countries. This product may contain one or more Nickel-metal hydride (NiMH), Lithium-ion, or Alkaline batteries. Specific battery information is given in this user guide. Batteries must be recycled or disposed of properly.

At the end of its life, this product must undergo separate collection and recycling from general or household waste. Please use the return and collection system available in your country for the disposal of this product.

EC Declaration of Conformity

These documents can be downloaded from: www.raesystems.com.

Sensor Specifications, Cross-Sensitivities, And Calibration Information

For information on sensor specifications, cross-sensitivities, and calibration information, refer to RAE Systems Technical Note TN-114: Sensor Specifications And Cross-Sensitivities (available for free download from www.raesystems.com). All specifications presented in this Technical Note reflect the performance of standalone sensors. Actual sensor characteristics may differ when the sensor is installed in different instruments. As sensor performance may change over time, specifications provided are for brand-new sensors.

2 Standard Contents

The MultiRAE MX is available in this kit:

- MultiRAE MX monitor with pump, sensors, battery, and wireless options as specified and protective rubber boot, filter, and belt clip installed
- Wheelmark-Specific Travel Charger / PC communications adapter
- PC communication cable
- AC adapter (6VDC)
- Calibration adapter
- Alkaline battery adapter (included with rechargeable configurations only)
- Spare filters
- Hex tool
- QuickStart Guide
- CD with documentation
- 10 charcoal filters (reduce CO cross-sensitivity to VOCs)
- CD with ProRAE Studio II instrument configuration and data management software
- Calibration and test certificate
- Warranty/registration card

3 General Information

The MultiRAE MX a multi-threat gas detector that combines continuous monitoring capabilities for toxic and combustible gases with Man Down Alarm functionality in one highly portable instrument. MultiRAE MX monitors offer an industry-leading selection of interchangeable field-replaceable electrochemical, combustible, and infrared sensors to fit a wide variety of applications. The MultiRAE MX's optional wireless capability elevates worker protection to the next level by providing safety officers real-time access to instrument readings and alarm status from any location for better visibility and faster response.

Sensor Specifications, Cross-Sensitivities, And Calibration Information

For information on sensor specifications, cross-sensitivities, and calibration information, refer to RAE Systems Technical Note TN-114: Sensor Specifications And Cross-Sensitivities (available for free download from www.raesystems.com). All specifications presented in this Technical Note reflect the performance of standalone sensors. Actual sensor characteristics may differ when the sensor is installed in different instruments. As sensor performance may change over time, specifications provided are for brand-new sensors.

3.1 Standard Sensor Configuration

The following sensors have been ATEX performance tested in the MultiRAE MX. Other sensors are available, but are not included in the performance certification of this instrument. Other sensors that can be used in this instrument are included in the table on page 72.

Sensor	Measurement Range	Manufacturer	RAE Systems Part Number
LEL	0 to 100% LEL	RAE Systems	C03-0911-000
O_2	0 to 30% Vol O_2	RAE Systems (Liquid O_2)	C03-0908-000
NDIR	0 to 100% Vol C_3H_8	RAE Systems (raw sensor: Dynament)	C03-0965-000
CO	0 to 2000 ppm CO	RAE Systems	C03-0903-000
H_2S	0 to 100 ppm H_2S	RAE Systems	C03-0907-001

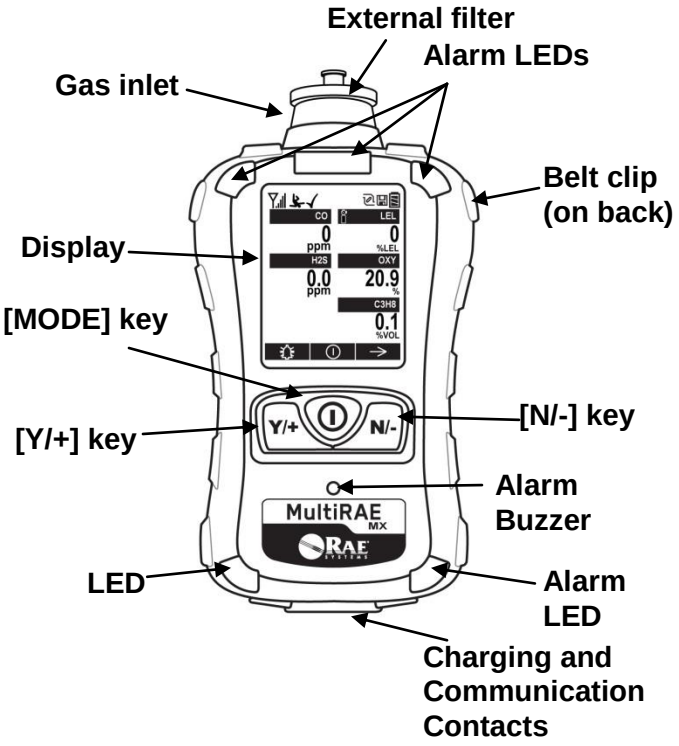
Notes:

- For LEL, NDIR and Oxygen sensors, only install the approved types listed in the table. At least one of these sensors must be installed in order to comply with the Wheelmark applied on the equipment.
- LEL, catalytic principle; PGM-6268X have been performance tested in 0 to 100% LEL in propane.
- NDIR has been ATEX performance tested in 0 to 100% Vol in propane.
- The ATEX performance test for combustible gases in accordance to EN 60079-29-1:2007 and EN 50271:2010 was certified in: FTZÚ 13 ATEX 0196X.
- Oxygen: O_2 was tested in 0 to 25% oxygen in accordance with EN 50104:2010
- Carbon Monoxide: CO, 0 to 2000 ppm
- Hydrogen Sulfide: H_2S, 0 to 100 ppm
- Was tested in accordance with EN 45544-1-2-3: 1999 and EN 50271:2010 and certified in: FTZÚ 14 EX 0008.
- Performance testing did not include special filters.

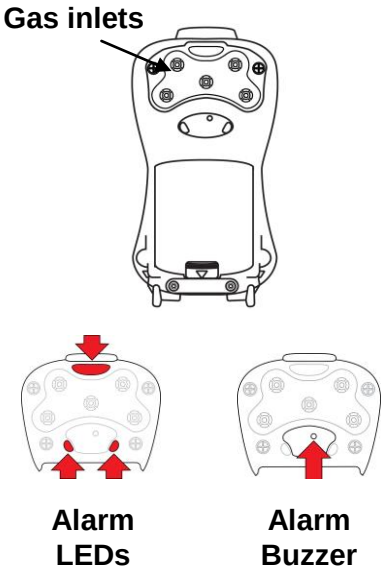
3.2 Key Features

- All-in-one continuous monitoring capabilities for oxygen and toxic and combustible gases
- Wireless access to real-time instrument readings and alarm status from any location
- Unmistakable five-way local and remote wireless notification of alarm conditions, including Man Down Alarm
- Large graphical display with easy-to-use, icon-driven user interface
- Simple maintenance with easily accessible sensors, pump, and plug-and-play Li-ion battery
- Fully-automated bump testing and calibration with AutoRAE 2 (pumped version only)

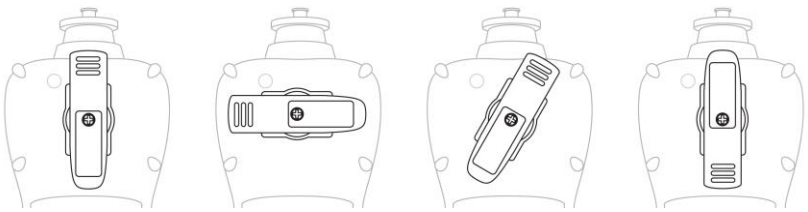
MultiRAE MX With Pump, front view



MultiRAE MX Diffusion Model, rear view



Note: The front of the diffusion model of the MultiRAE MX is the same as the pumped model, but instead of a single gas inlet at the top, there are five inlets on the back side, as well as an extra alarm buzzer and LEDs.



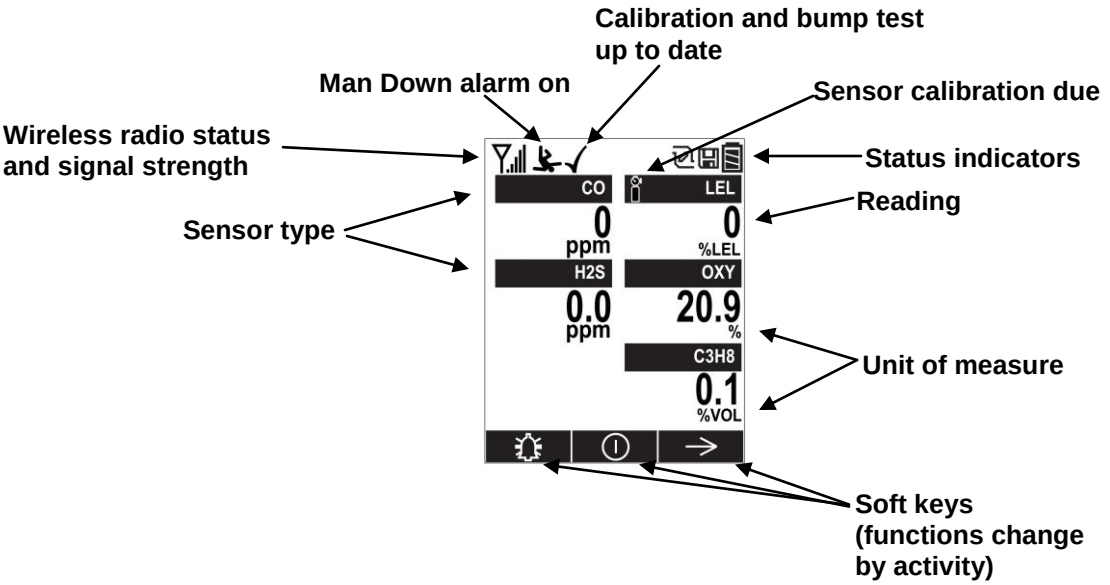
The belt clip on the back of the pumped version can be swiveled for holding the instrument at different angles.

4 User Interface

The MultiRAE MX's user interface consists of the display, LEDs, an alarm buzzer, and three keys.

4.1 Display Overview

The LCD display provides visual feedback that includes the sensor types, readings, time, battery condition, and other functions.



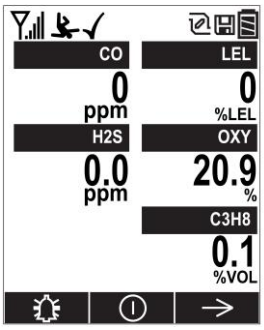
4.1.1 Status Indicator Icons

Along the top of most screens are status indicators that tell you whether a function is operating and/or its strength or level.

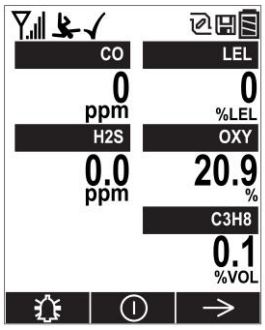
Icon	Function
	Wireless status: the radio is on
	Wireless status: the radio is off
	The instrument is not equipped with a radio (no icon)
	Wireless strength (0 to 5 bars)
	Pump status (only on pump-equipped models)
	Datalogging status (shown when datalogging is on, blank when off)
	Battery status (three segments show battery charge level)
	Man Down alarm enabled
	Sensor calibration due
	Bump test due
✓	All sensors tested and calibrated tick mark (all sensors have been bump tested and calibrated; no sensor is overdue for a bump test or calibration according to the intervals configured on the instrument

4.1.2 LCD Flip

The MultiRAE MX senses its vertical/horizontal orientation, and can automatically flip the display180 degrees, making it easy to read if the MultiRAE MX is upside down. (You can turn this feature on or off in Programming Mode, under "Monitor.")



As the MultiRAE MX is tilted, the sensor detects its orientation and inverts the screen when it is past its horizontal position.



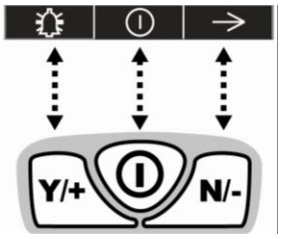
4.1.3 Keys & Interface

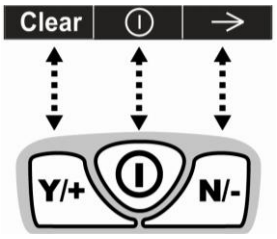
The MultiRAE MX has three keys:

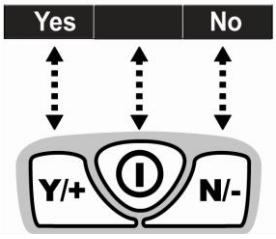
Y/+ MODE N/-

In addition to their labeled functions, the keys labeled [Y/+], [MODE], and [N/-] act as "soft keys" that control different parameters and make different selections within the instrument's menus. From menu to menu, each key controls a different parameter or makes a different selection.

Three panes along the bottom of the display are "mapped" to the keys. These change as menus change, but at all times the left pane corresponds to the [Y/+] key, the center pane corresponds to the [MODE] key, and the right pane corresponds to the [N/-] key. Here are examples that show the relationships of the keys and functions:





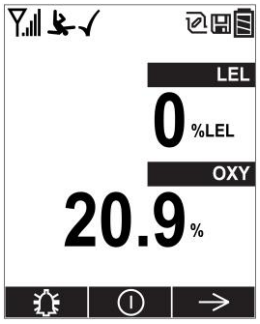


In addition to the functions described above, any of the keys can be used to manually activate display backlighting. Press any key when the backlighting is off to turn it on.

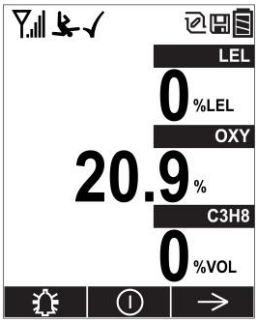
4.2 Screen Display For Various Numbers Of Active Sensors

The MultiRAE MX can accommodate from one to five sensors (some are dual sensors), depending on the configuration. In order to maximize readability and the amount of information shown, the display is automatically reconfigured, according to the number and types of sensors in the MultiRAE MX.

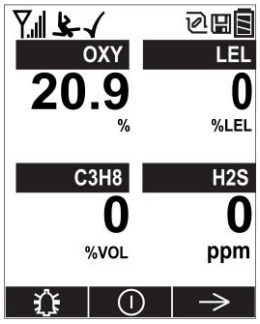
One sensor.



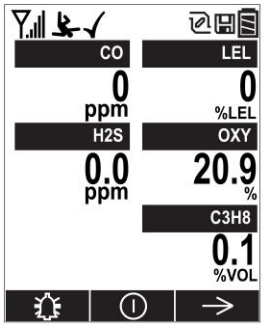
Two sensors.



Three sensors.



Four sensors.



Five sensors.

4.3 Menus

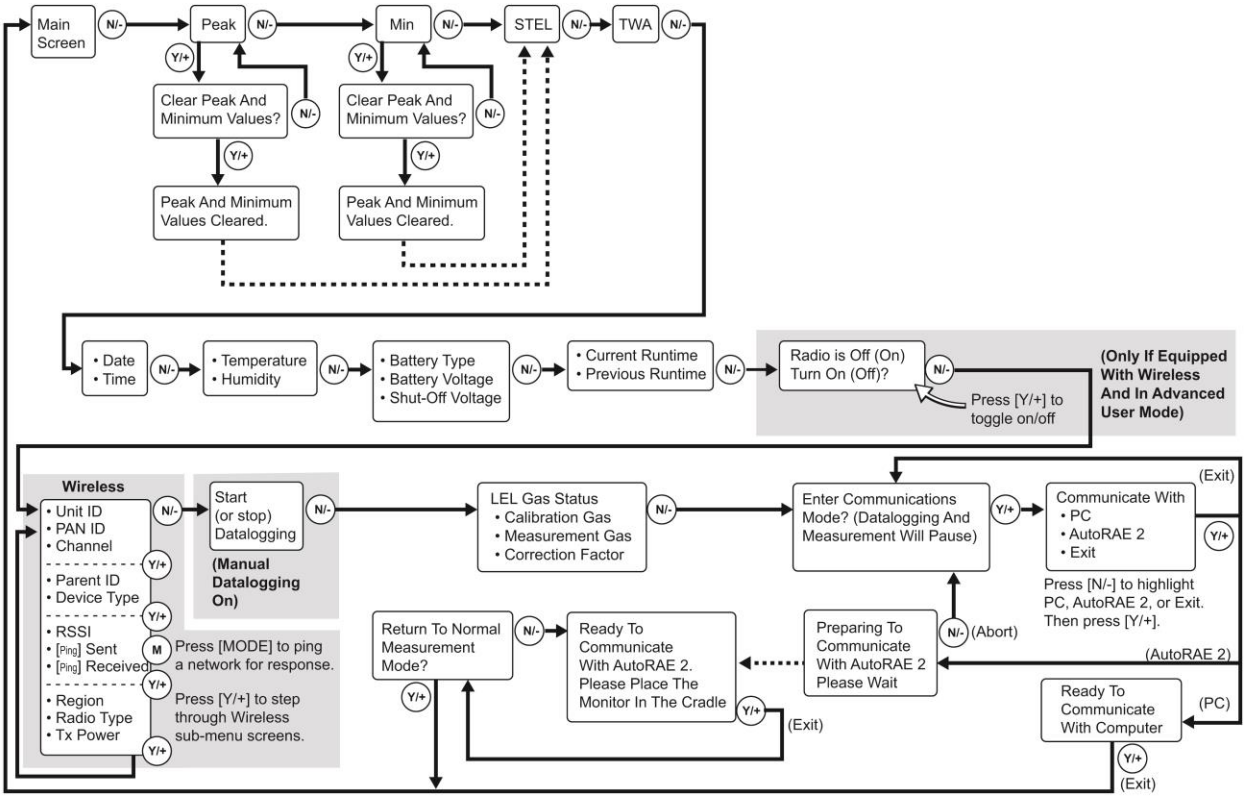
The reading menus are easy to step through by pressing the [N/-] key.

Hygiene Mode, in which sampling is continuous, allows you to clear peak and minimum values at any time.

Search Mode allows you to clear peak and minimum values, but samples only when you tell it to sample. This allows you to save sample readings as individual events in the datalog.

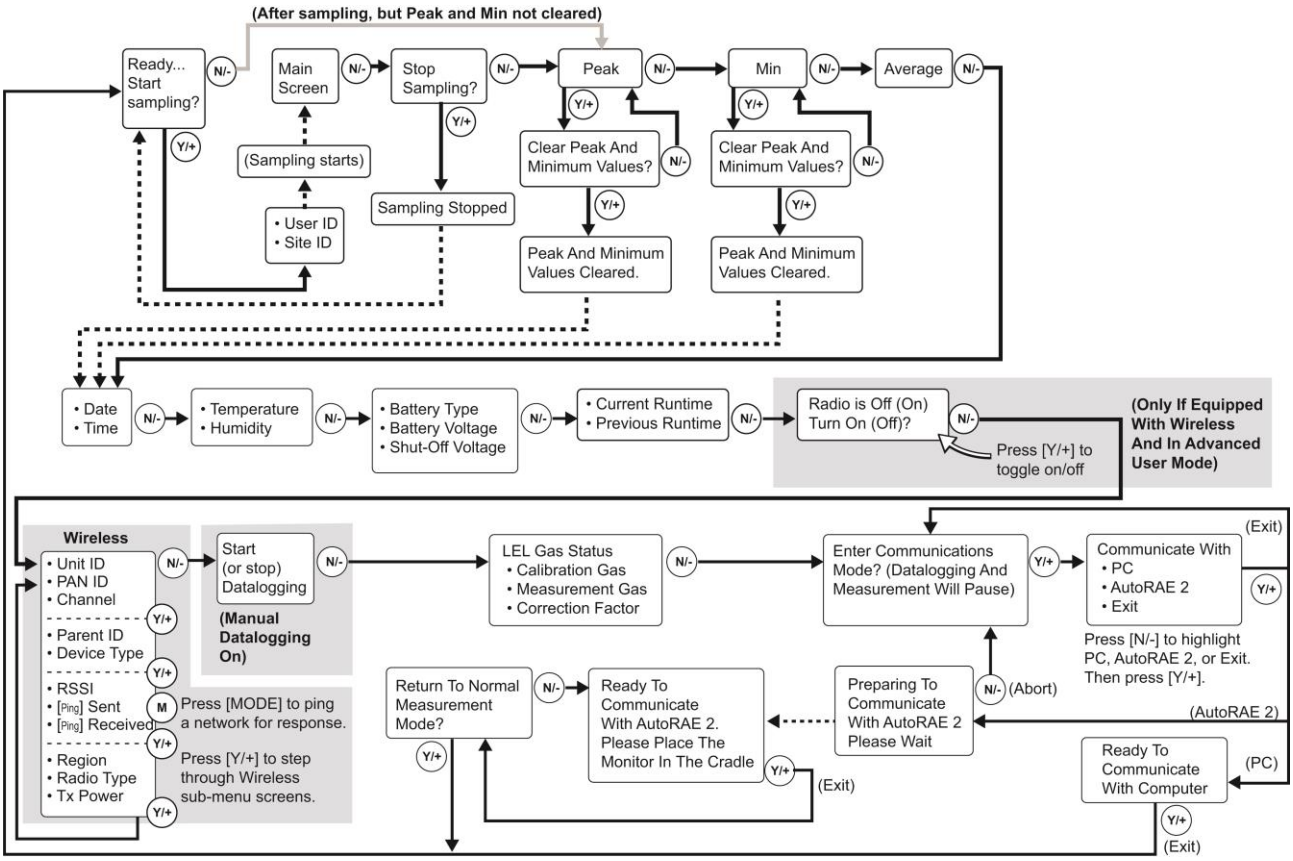
Note: You can switch between Hygiene and Search modes via the Programming Menu (Select Monitor and then Operation Mode).

Hygiene Mode



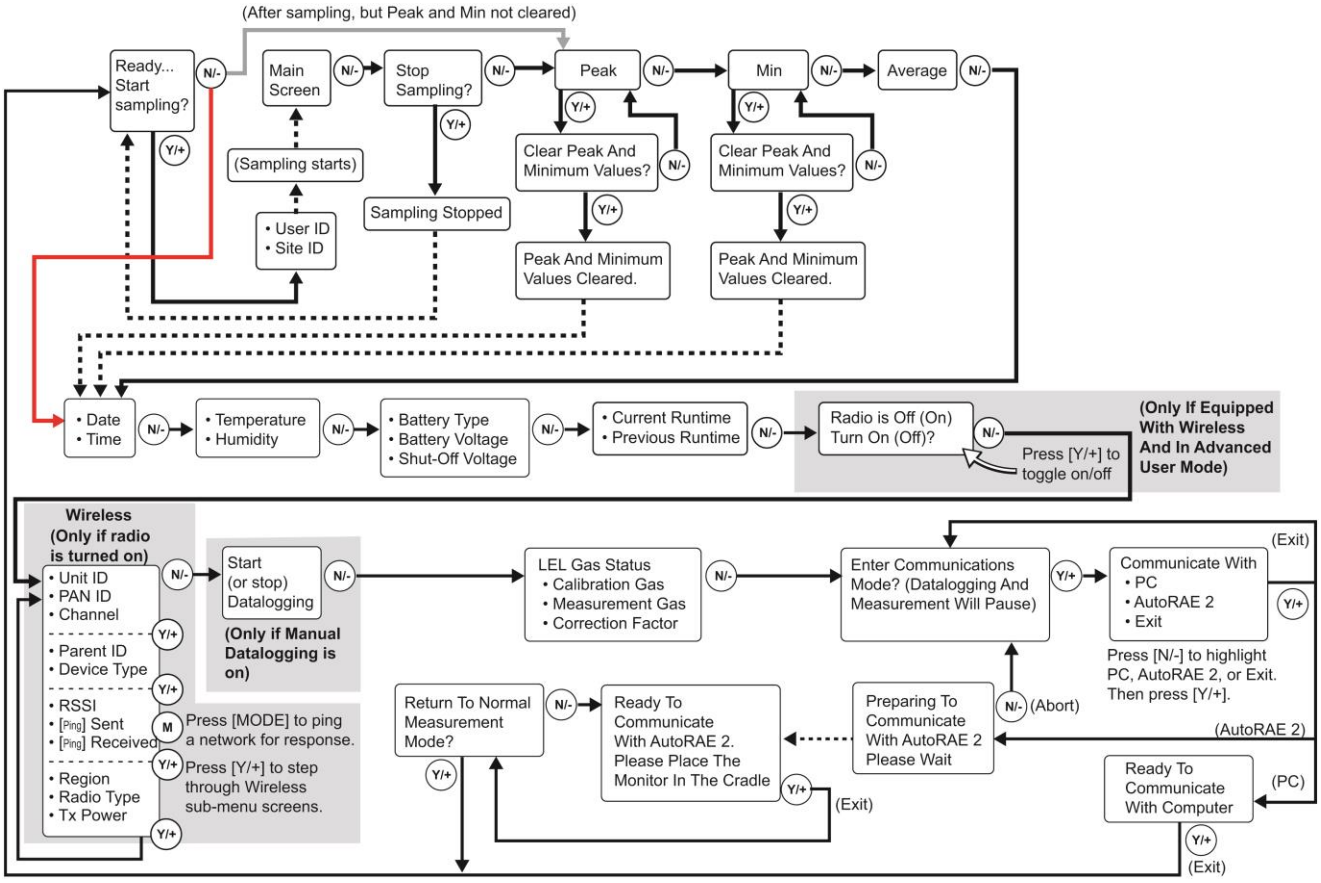
Note: Dashed line indicates automatic progression.

Search Mode



Note: Dashed line indicates automatic progression.

Note: If the Peak or Min is cleared, the Average is also cleared. In addition, each cycle through the main screen after they are cleared will route from "Ready… Start sampling?" directly to Date and Time if you press [N/-] (see red line in diagram below), until you perform a new sample. Also, if you start sampling again and stop sampling, clear the Peak, or clear the Min, it advances to Date and Time, as well.



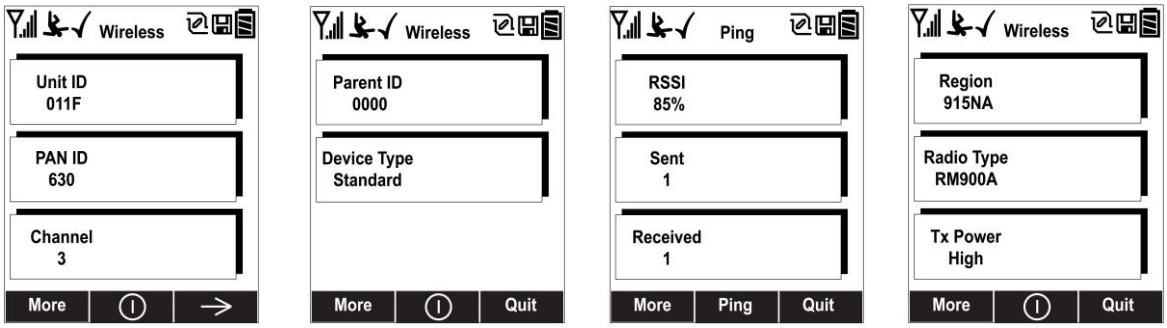
Note: Dashed line indicates automatic progression.

5 Wireless Control And Submenus

When you step through the main menu, as shown in the previous three diagrams, there are two screens for wireless communication. **Note:** These are only present if the MultiRAE MX is equipped with a wireless module.

At the Radio On/Off screen, you can turn the radio on or off, if the MultiRAE MX is in Advanced User Mode. The radio turns off instantly, but turning on the radio takes a few seconds, so you see a screen that indicates the radio is being turned on. If the instrument is in Basic User Mode, the option for turning the radio on or off does not appear (you can turn it on or off in Programming Mode).

At the Wireless screen, you can check communication with other wireless devices and get other useful information about the wireless settings. The Wireless menu is divided into a sequence of four "pages," each presenting different information. As you press [Y/+] on each of the "pages," you advance to the next one.



Unit ID (unique identifier of the instrument's radio), Pan ID, and Channel are read-only parameters that help you to check whether the instrument's wireless settings are correct (very helpful for troubleshooting).

The next "page," Parent ID and Device Type are also read-only. The Parent ID (the ID of the "Parent" wireless device to which the monitor is connected) is not changeable. The device type tells you that it is "Standard," meaning it transmits and receives.

The third "page" is labeled "Ping," where you can check the signal strength via RSSI (received signal strength indication) and "ping" the network to confirm an active two-way communication network. Each time you press [MODE] to "ping" the network, a number of sends is included under "Sent." If the network receives the signal and sends one back, which is in turn received by the MultiRAE, then a number is added under "Received."

The fourth "page" includes the type of transmitter (Region), Radio Type (model), and Tx Power (transmission power). These are primarily for diagnostics and troubleshooting.

When you reach the fourth "page," you can wrap around to the first one by pressing [Y/+]. Otherwise, you can press [N/-] to quit, which advances to the next screen.

6 Battery

Always fully charge the battery before using the MultiRAE MX. Its Li-ion battery is charged by connecting the MultiRAE MX to its Travel Charger (PN: M01-3021-200). Contacts on the bottom of the instrument meet the Travel Charger's contact pins, transferring power.

The PGM-6268X should only be fitted with RAE Systems Battery Pack type M01-3055-000 or M01-3053-000 or Battery Adapter M01-3054-000 fitted with Duracell MN1500 batteries.

Note: Before connecting the MultiRAE MX with its Travel Charger, visually inspect the contacts to make sure they are clean. If they are not, wipe them with a soft, dry cloth. Do not use solvents or cleaners.

WARNING

To reduce the risk of ignition of hazardous atmospheres, recharge, remove or replace the battery only in an area known to be non-hazardous! Do not mix old and new batteries or batteries from different manufacturers.

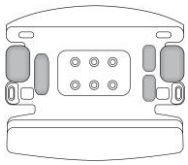
IMPORTANT!

Only use the Travel Charger For Wheel Mark and the Switch-Mode Power Supply (PN: 500-0150-000) designed for use with the MultiRAE MX (PN: M01-3021-200) in this application.

6.1 Using The Travel Charger

Follow these steps to use the Travel Charger.

Before attaching the Travel Charger, check that it is aligned correctly with the base of the MultiRAE MX. There are two alignment points on one side and one alignment point on the other side, designed to mate with matching points on the bottom of the MultiRAE MX:



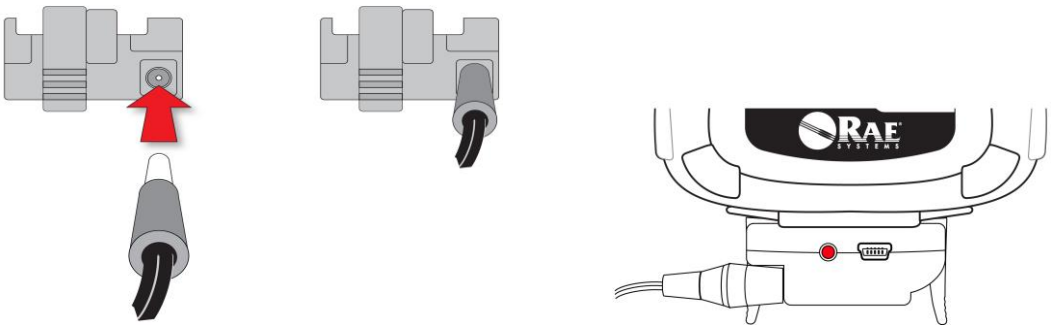
1. Check bottom of MultiRAE MX Travel Charger's alignment pins for correct orientation with the MultiRAE MX.

2. Align Travel Charger with bottom of MultiRAE MX.

3. Press Travel Charger onto bottom of MultiRAE MX.

4. Make sure the Travel Charger is firmly attached.

Next, put the plug from the power supply into the jack on the side of the Travel Charger:



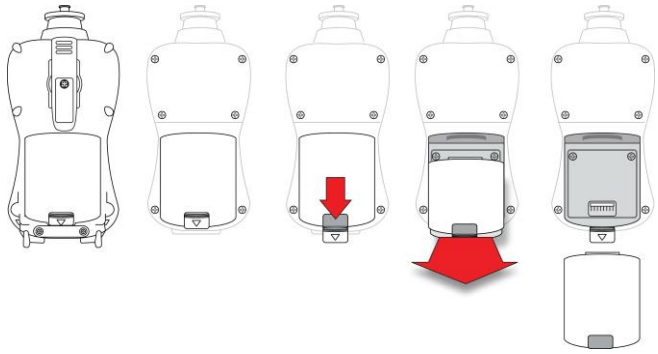
Plug the other end of the charger into a power source (AC outlet). When power is applied and the MultiRAE MX's battery is charging, the LED glows red. The LED glows green when the battery is fully charged.

6.2 Replacing A Battery

The MultiRAE MX battery packs are plug-and-play, and can be replaced on the go without tools. To replace the MultiRAE MX battery:

1. Remove the battery adapter from the instrument by sliding the tab and tilting out the adapter.

   Note: The belt clip and rubber boot are removed in the illustration for clarity. They can be left on while replacing a battery.

   Tilt a fully charged battery (or alkaline battery adapter) into the battery compartment and place it in the instrument.

2. Slide the tab back into place to secure the battery.

6.3 Battery States

The battery icon on the display shows how much charge is in the battery and alerts you to any charging problems.

Full charge	2/3 charge	1/3 charge	Low charge	Battery alert

When the battery's charge falls below a preset voltage, the instrument warns you by beeping once and flashing once every minute, and the "empty battery" icon blinks on and off once per second. The instrument automatically powers down within 10 minutes, after which you will need to either recharge the battery, or replace it with a fresh one with a full charge.

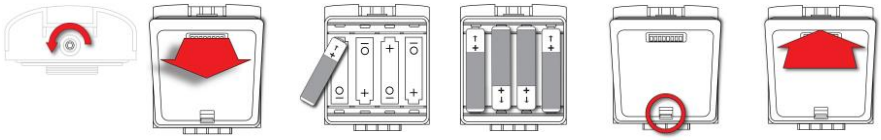
6.4 Alkaline Battery Pack

An alkaline battery adapter is supplied with each instrument. The adapter (part number M01-3054-000) is installed and removed just like the rechargeable battery. It accepts four AA alkaline batteries (use only Duracell MN1500) and provides approximately 8 hours of normal operation. (An optional rechargeable lithium-ion battery pack, part number M01-3053-000 or M01-3055-000.)

Note: The vibration alarm is disabled whenever the alkaline adapter is used.

To replace the alkaline adapter's batteries:

1. Remove the hex-socket screw at the end of the adapter.
2. Lift the cover off the battery compartment.
3. Insert four fresh AA batteries as indicated by the polarity (+/-) markings.
4. Replace the cover and replace the hex screw.



IMPORTANT!

Alkaline batteries cannot be recharged. The instrument's internal circuit detects alkaline battery pack and will not allow recharging. If you place the instrument in its Travel Charger, the alkaline battery will not be recharged. The internal charging circuit is designed to prevent damage to alkaline batteries and the charging circuit when alkaline batteries are installed inside the instrument. If you try to charge alkaline batteries installed in the instrument, the Travel Charger's charging LED does not glow, indicating that it will not charge them.

The alkaline battery adapter accepts four AA alkaline batteries (use only Duracell MN1500). Do not mix old and new batteries or batteries from different manufacturers.

Note: When replacing alkaline batteries, dispose of old ones properly.

7 Turning The MultiRAE MX On And Off

7.1 Turning The MultiRAE MX On

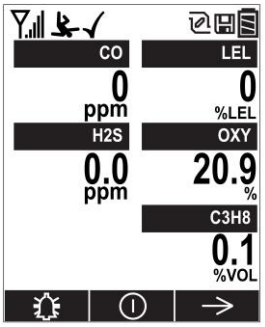
With the instrument turned off, press and hold the [MODE] key until the beep sounds and the display and LED alarm lights turn on, and then release.

A RAE Systems logo (or a company name) should appear first. This is followed by a progression of screens that tell you the MultiRAE MX's current settings:

- Product name and model number, air flow type, and serial number
- Application firmware version, build date, and build time
- Sensor firmware, build date, build time
- Installed sensors (including serial number/production/expiration/calibration date and alarm limit settings)
- Current date, time, temperature, and relative humidity
- User mode and operation mode
- Battery type, voltage, shutoff voltage
- Alarm mode and alarm settings
- Datalog period (if it is activated) and interval
- Policy Enforcement settings (whether calibration and/or bump testing are enforced)

Note: To speed up the startup time, the number of screens shown on startup can be reduced by enabling the Fast Startup option under Programming/Monitor.

Then the MultiRAE MX's main reading screen appears. It may take a few minutes for sensors to show a reading, so if any have not warmed up by the time the main screen is shown, you will see "- - -" instead of a numerical value until the sensor provides data (typically less than 2 minutes). Then it displays instantaneous readings similar to the following screen (depending on the sensors installed) and is ready for use.



Note: If the battery is completely empty, then the display briefly shows the message "Battery Fully Discharged," and the MultiRAE MX shuts off. You should charge the battery or replace it with a fully charged battery before turning it on again.

7.2 Turning The MultiRAE MX Off

Press and hold [MODE]. A 5-second countdown to shutoff begins. You must hold your finger on the key for the entire shutoff process until the MultiRAE MX is powered off.

7.3 Testing Alarm Indicators

Under normal-operation mode and non-alarm conditions, the buzzer, vibration alarm, LED, and backlight can be tested at any time by pressing [Y/+] once.

IMPORTANT!

If any of the alarms does not respond to this test, check the Alarm Settings in Programming Mode. It is possible that any or all of the alarms have been turned off. If all of the alarms are turned on, but one or more of them (buzzer, LED lights, or vibration alarm) does not respond to this test, do not use the instrument. Contact your RAE Systems distributor for technical support.

7.4 Pump Status

IMPORTANT!

During operation, make sure the probe inlet and the gas outlet are free of obstructions. Obstructions can cause premature wear on the pump, false readings, or pump stalling. During normal operation, the pump icon alternately shows inflow and outflow as shown here:

If there is a pump failure or obstruction that disrupts the pump, the alarm sounds and you see this icon blinking on and off:

Once the obstruction is removed, you can try to restart the pump by pressing the [Y/+]. If the pump does not restart, and the pump stall alarm continues, consult the Troubleshooting section of this guide or contact RAE Systems Technical Support.

Note: Pump Status is not indicated on diffusion MultiRAE MXs.

7.5 Calibration Status

The instrument displays this icon next to the sensor that requires calibration:

Calibration is required (and indicated by this icon) if:

- The sensor module has been replaced with one whose calibration is overdue.
- The defined period of time between calibrations has been exceeded.
- If you have changed the calibration gas type without recalibrating the instrument.
- The sensor has failed a previous calibration.

7.6 Bump Status

The instrument displays this icon next to the sensor that requires bump test:

A bump test is required (and indicated by this icon) if:

- The defined period of time between bump tests has been exceeded (bump test overdue).
- The sensor has failed a previous bump test.
- The sensor(s) should be challenged on a periodic basis.

8 Modes Of Operation

The MultiRAE MX has two operation modes and two user modes.

8.1 Hygiene Operation Mode

Hygiene Mode provides continuous monitoring.

8.2 Search Operation Mode

Search Mode provides monitoring only when monitoring is turned on. This allows specific samples to be taken at different times, rather than continuously.

8.3 Basic User Mode

In Basic User Mode, some restrictions are applied, including password protection that guards against entering Programming Mode by unauthorized personnel.

8.4 Advanced User Mode

In Advanced User Mode, there are no access restrictions (you do not need a password), and MultiRAE MX provides the indications and data you need most for typical monitoring applications.

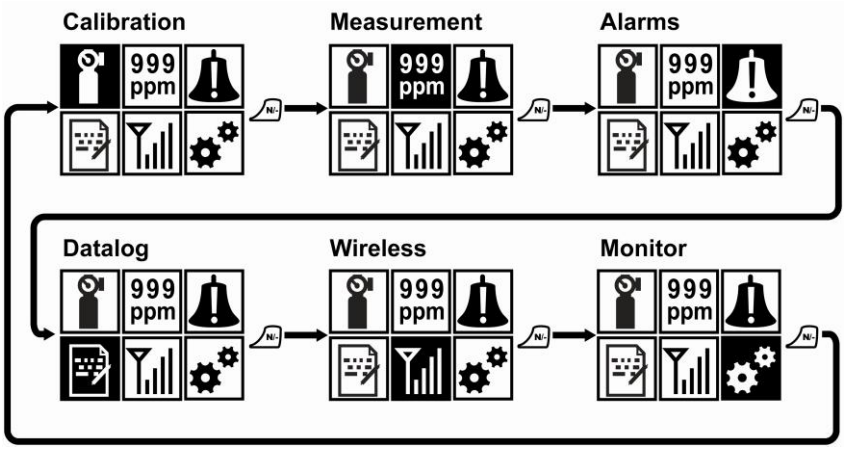
9 Programming

The menu in Programming Mode is to adjust settings, calibrate sensors, and initiate communication with a computer. It has the following submenus:

- Calibration
- Measurement
- Alarms
- Datalog
- Wireless
- Monitor

9.1 Enter Programming In Advanced Mode

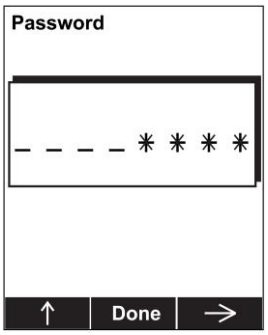
1. To enter Programming Mode, press and hold [MODE] and [N/-] until you see the Calibration screen. No password is necessary in Advanced Mode.
2. Press [N/-] to step through the programming screens.



To enter a menu and view or edit parameters in its submenus, press [Y/+].

9.2 Enter Programming In Basic Mode

1. To enter Programming Mode, press and hold [MODE] and [N/-] until you see the Password screen.



2. Input the 4-digit password:

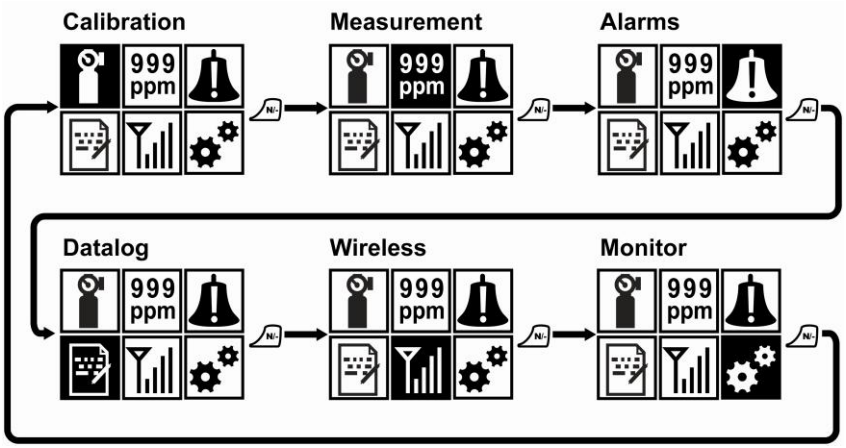
- Increase the number from 0 through 9 by pressing [Y/+].
- Step from digit to digit using [N/-].
- Press [MODE] when you are done.

If you make a mistake, you can cycle through the digits by pressing [N/-] and then using [Y/+] to change the number in each position.

Note: The default password is 0000.

Note: The password screen only appears when you enter the Programming Mode the first time after turning the instrument on in Basic Mode. If you have input the correct password, you do not have to input it again to enter Programming Mode until you turn the instrument off and on again.

Once you enter Programming Mode, the Calibration screen is shown. Press [N/-] to step through the programming screens.



To enter a menu and view or edit parameters in its submenus, press [Y/+].

9.3 Menus And Submenus

In Programming Mode, menus and submenus are organized as shown here:

Calibration	**Measurement**	**Alarms**	**Datalog**	**Wireless***	**Monitor**
Fresh Air	Sensor On/Off	Alarm Limits	Clear Datalog	Radio ON/OFF	LCD Contrast
Multi Sensor Span	Change Meas. Gas	Alarm Mode	Datalog Interval	PAN ID	Operation Mode
Single Sensor Zero	Measurement Units	Alarm Settings	Sensor Selection	Channel	Pump Speed**
Single Sensor Span		Comfort Beep	Data Selection	Join Network	Zero At Start
Multi Sensor Bump		Man Down Alarm	Datalog Type	Interval	Fast Startup
Single Sensor Bump			Memory Full Action	Off Network Alarm	Temperature Units
Cal. Reference				Factory Reset	Language
Change Cal. Gas					Site ID
Multi Cal. Select					User ID
					Date Format
					Date
					Time Format
					Time
					User Mode
					Backlight
					LCD Flip

* This menu is available on wirelessly equipped instruments only.

** Pump-equipped version only.

9.3.1 Editing And Selecting Parameters And Sensors

There are a few basic ways to edit parameters, select sensors, and perform other activities in the MultiRAE MX. The actions performed by pressing keys always match 1-to-1 with the boxes along the bottom of the display and the three keys. Some parameters are edited by scrolling and selecting individual items (black bars behind white text act as highlighters). Some include a choice via "radio buttons," where only one item in a list can be selected, while other menus use boxes for you to "check" with an "X," and these allow for multiple items in a list to be selected. In all cases of editing, you can save or undo your choice.

9.3.2 Calibration

Use this menu to perform zero or span calibration for one or more sensors, and change the gas concentration value assumed to be used in span calibration, as well as zero calibration and calibration reference gas.

9.3.2.1 Fresh Air

This procedure determines the zero point of the sensor calibration curve for all the sensors that require a zero calibration.

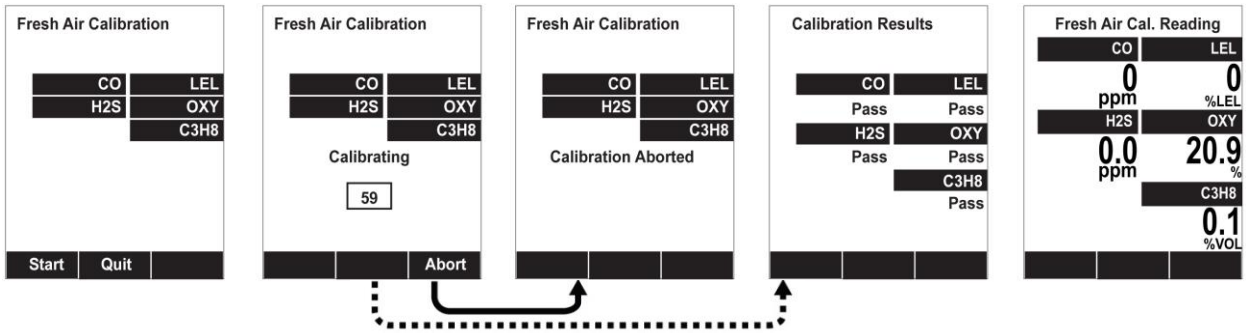
This procedure determines the zero point of the sensor calibration curve for all the sensors that require a zero calibration. For the oxygen sensor, Fresh Air calibration sets the point equal to the concentration of oxygen in ambient air (approximately 20.9% volume).

Note: Fresh air calibration is performed on all enabled gas sensors at the same time.

To perform Fresh Air calibration on multiple sensors:

1. If using dry air, install the calibration adapter and connect it to a source of dry air. Otherwise do not use calibration adapter to perform fresh air calibration.
2. At the Calibration Menu, select "Fresh Air." Press [Y/+] once to enter the fresh air calibration sub-menu.

3. Start the flow of dry air, if used.
4. Press [Y/+] to start fresh air calibration.
5. A countdown screen appears. You can abort the calibration at any time during the countdown by pressing [N/-].



Note: Dotted line indicates automatic progression.

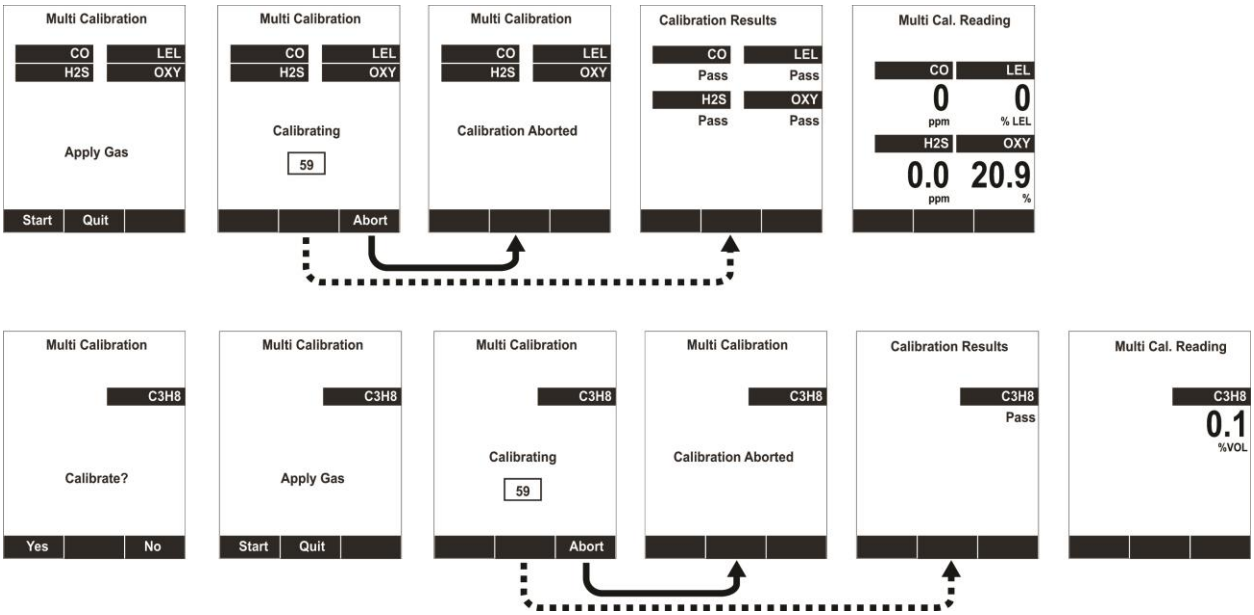
6. If the calibration is not aborted, the display shows the sensor names and tells you whether the fresh air calibration passed or failed, followed by the sensors' fresh air readings.

9.3.2.2 Multi Sensor Span

Depending on the configuration of your MultiRAE and span gas you have, you can perform a span calibration simultaneously on multiple sensors. You can define which sensors are calibrated together using the Multi Cal Select menu described in section 9.3.2.9.

In case all sensors in the instrument cannot be calibrated with the same gas, the MultiRAE will intelligently split the span calibration process into several steps and will provide menu prompts accordingly.

1. At the Calibration Menu, select "Multi Sensor Span."
2. Install the calibration adapter and connect it to a source of calibration gas.
3. Start the flow of calibration gas.
4. Press [Y/+] to start calibrating or wait for calibration to start automatically.
5. A countdown screen is shown. You can abort the calibration at any time during the countdown by pressing [N/-].



Note: Dotted line indicates automatic progression.

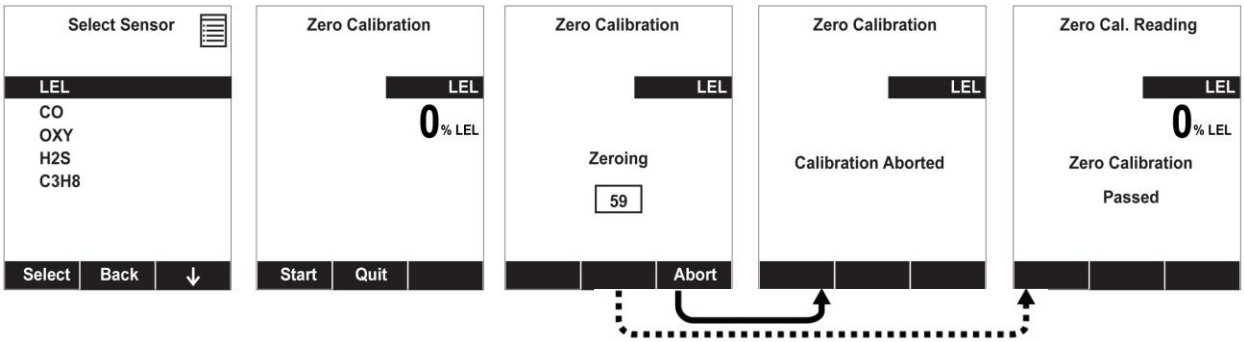
6. If the calibration is not aborted, the display shows the sensor names and tells you whether the calibration passed or failed, followed by the sensor readings.

9.3.2.3 Single Sensor Zero

This allows you to perform zero (fresh air) calibration on individual sensors. Even though most toxic gas sensors can be zeroed in fresh air, some sensors should not be zeroed in fresh air. Refer to RAE Systems Technical Note TN-114 to confirm fresh-air zeroing can be performed with your specific MultiRAE MX configuration.

1. If you are using a charcoal filter, connect it to the instrument.
2. If you are using dry air, install the calibration adapter and connect it to a source of dry air.
3. At the Calibration Menu, select "Single Sensor Zero." Press [Y/+] once to enter the zero calibration sub-menu.
4. Start the flow of dry air, if used.

5. Press [Y/+] to start zero calibration.
6. A countdown screen appears. You can abort the calibration at any time during the countdown by pressing [N/-].



Note: Dotted line indicates automatic progression.

7. If the calibration is not aborted, the display shows the sensor names and tells you whether the zero calibration passed or failed, followed by the sensors' zero calibration readings.

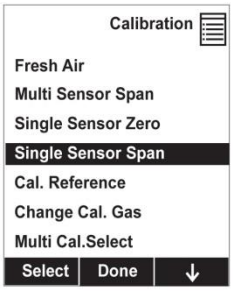
9.3.2.4 Single Sensor Span

Instead of performing a span calibration on multiple sensors simultaneously, you can select a single sensor and perform a span calibration.

Note: If a calibration icon (bottle with bottom portion filled in) is shown next to any of the sensors, it means that the sensor is due for a full calibration.

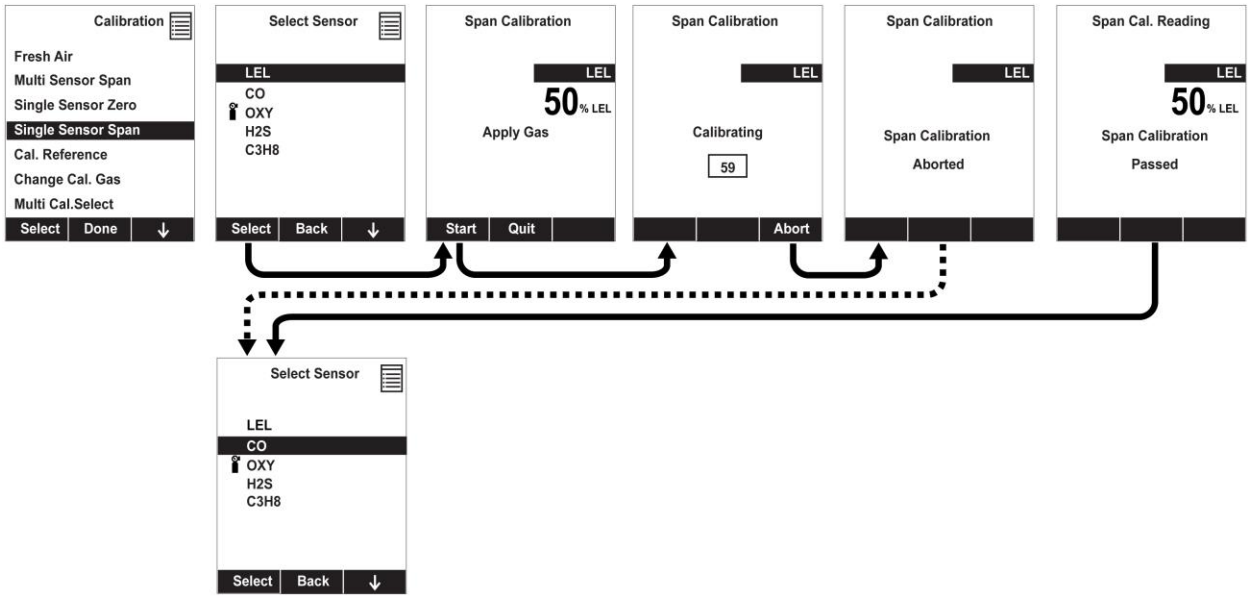
To perform span calibration of an individual sensor, follow these steps:

1. At the Calibration Menu, select "Single Sensor Span."
2. Select a sensor to calibrate from the list.
3. Install the calibration adapter and connect it to a source of calibration gas.
4. Verify that the displayed calibration value meets the concentration specified on the gas cylinder.
5. Start the flow of calibration gas.



6. Press [Y/+] to start calibrating or wait for calibration to start automatically.

7. A countdown screen appears. You can abort the calibration at any time during the countdown by pressing [N/-].



Note: Dotted line indicates automatic progression.

8. If the calibration is not aborted, the display shows the sensor names and tells you whether the calibration passed or failed, followed by the sensor readings.

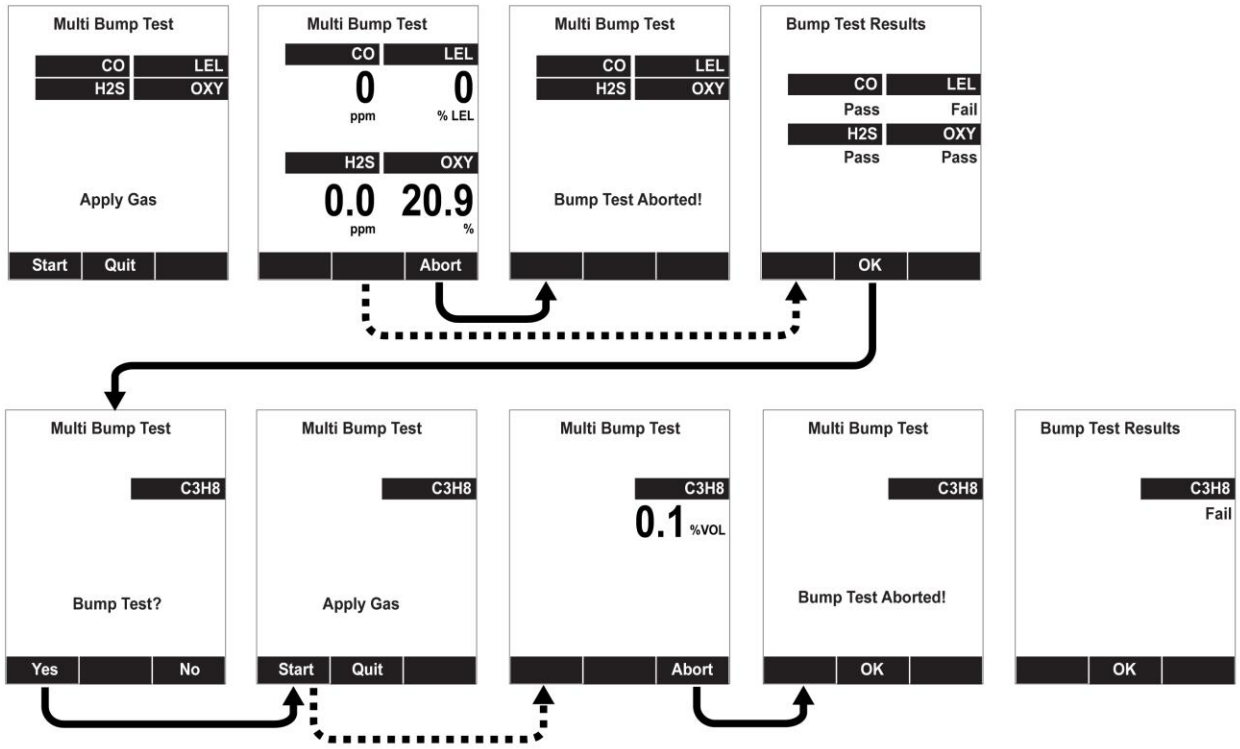
9.3.2.5 Multi Sensor Bump

Depending on the configuration of your MultiRAE MX and span gas you have, you can perform a bump test simultaneously on multiple sensors. Which sensors are bump tested simultaneously is defined in the Multi Cal Select menu. Refer to section 9.3.2.9 for more information.

In case all sensors in the instrument cannot be calibrated with the same gas, the MultiRAE will intelligently split the span calibration process into several steps and will provide menu prompts accordingly.

1. At the Calibration Menu, select "Multi Sensor Bump."
2. Install the calibration adapter and connect it to a source of calibration gas.
3. Start the flow of calibration gas.
4. Press [Y/+] to start calibrating or wait for calibration to start automatically.

5. A countdown screen is shown. You can abort the calibration at any time during the countdown by pressing [N/-].



Note: Dotted line indicates automatic progression.

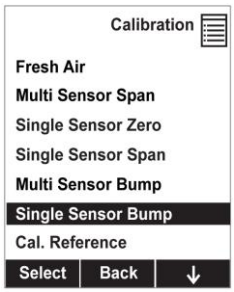
6. If the calibration is not aborted, the display shows the sensor names and tells you whether the calibration passed or failed, followed by the sensor readings.
7. If a sensor requires different gas, you are prompted. Change the calibration gas, and when you are ready, start bump testing by pressing [Y/+].

Note: You can quit the bump calibration procedure and exit to the menu whenever you see "Quit." Press [MODE] to quit.

9.3.2.6 Single Sensor Bump

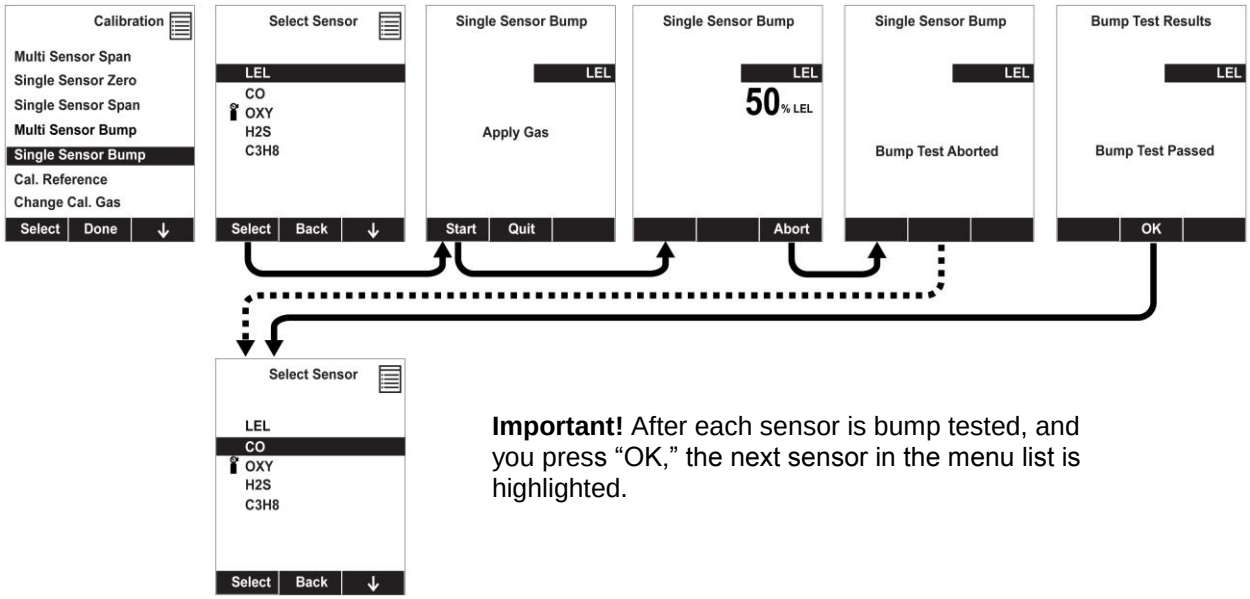
This menu allows a bump test to be performed on an individual sensor of your choice.

Note: If a bump test icon (bottle with bottom portion not filled in) is shown next to any of the sensors, it means that the sensor is due for a bump test.



To perform a bump test on an individual sensor, follow these steps:

1. At the Calibration Menu, select "Single Sensor Bump."
2. Scroll down the list using [N/-], and then press [Y/+] to select a sensor to calibrate.
3. Install the calibration adapter and connect it to a source of calibration gas.
4. Verify that the displayed calibration value meets the concentration specified on the gas cylinder.
5. Start the flow of calibration gas.



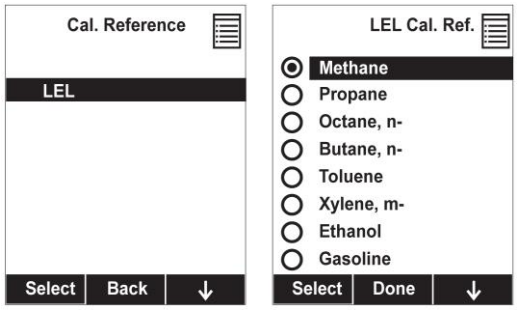
Important! After each sensor is bump tested, and you press "OK," the next sensor in the menu list is highlighted.

Note: Dotted line indicates automatic progression.

6. Press [Y/+] to start calibrating or wait for calibration to start automatically.
7. A countdown screen appears. You can abort the calibration at any time during the countdown by pressing [N/-].
8. If the calibration is not aborted, the display shows the sensor names and tells you whether the calibration passed or failed, followed by the sensor readings.

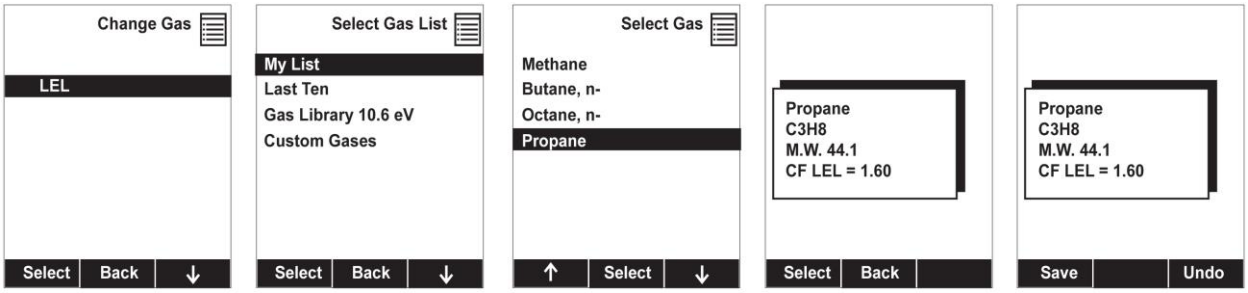
9.3.2.7 Cal. Reference

It is sometimes desirable to calibrate a sensor (LEL) with a specific gas for best response to a gas you are surveying. The Cal. Reference library contains calibration curves for LEL sensors for select gases. Choose the sensor, and then select from the list of reference gases.



9.3.2.8 Change Cal. Gas

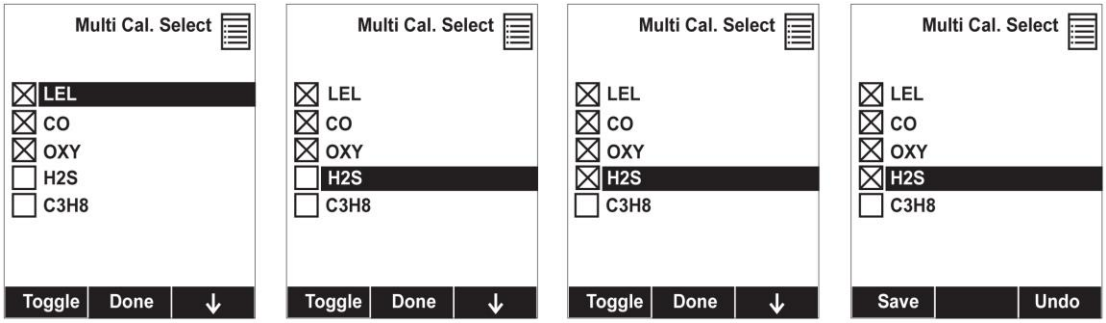
You can change the calibration gas for the MultiRAE's LEL sensor. Select from a custom list that you create (My List), the last ten gases used and user-defined custom gases. Each gas is shown in the list for selection and the screen automatically changes to show its full name, chemical formula, molecular weight (M.W.) and correction factor (CF).



9.3.2.9 Multi Cal Select

This menu allows you to define a group of sensors to be bump tested and span calibrated together. Simultaneous testing and calibration of multiple sensors shortens the bump test and calibration processes and reduces the number of individual gas cylinders you need. For example, it may be more efficient to use a single cylinder with a four-gas mix including 50% LEL Methane, 18% O_2, 10 ppm H_2S, and 100 ppm CO, to calibrate the LEL, O_2, CO, and H_2S sensors at one time, compared to using four distinct gas cylinders and calibrate these sensors individually in sequence. In order for sensors to be calibrated together, all of them must be selected using Multi Cal. Select.

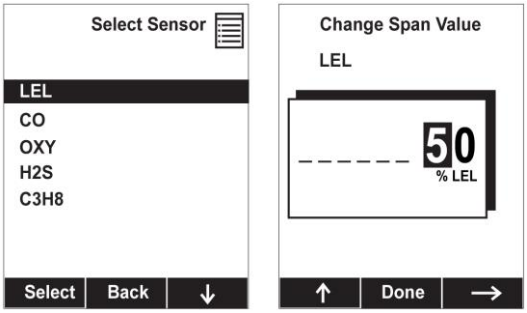
1. Scroll down the list of sensors using the [N/-] key.
2. Add or remove that gas from the list by pressing [Y/+]. An "X" in a box to the left of a sensor's name indicates it is selected.
3. Once you have made all your selections, press [MODE] for "Done."



9.3.2.10 Change Span Value

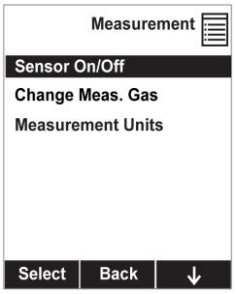
You can individually set the span gas concentration for each sensor. This concentration setting will also be used for a bump test. The units of measure (ppm, %LEL, etc.) are shown on the display.

1. Scroll down the list of sensors using the [N/-] key.
2. Press [Y/+] to select it.
3. Press [N/-] to step through the digits.
4. Press [Y/+] to increase the number from 0 through 9. Once the number 9 is reached, pressing [Y/+] causes the numbers to "wrap around" to 0 and count up again.
5. Once you have set the desired value, press [MODE] for "Done." This registers the new span value.



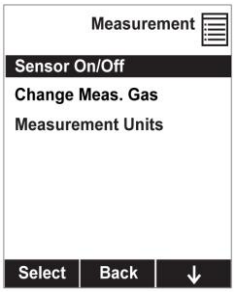
9.3.3 Measurement

The submenus for Measurement include Sensor On/Off, Change Measurement Gas, and Measurement Units.

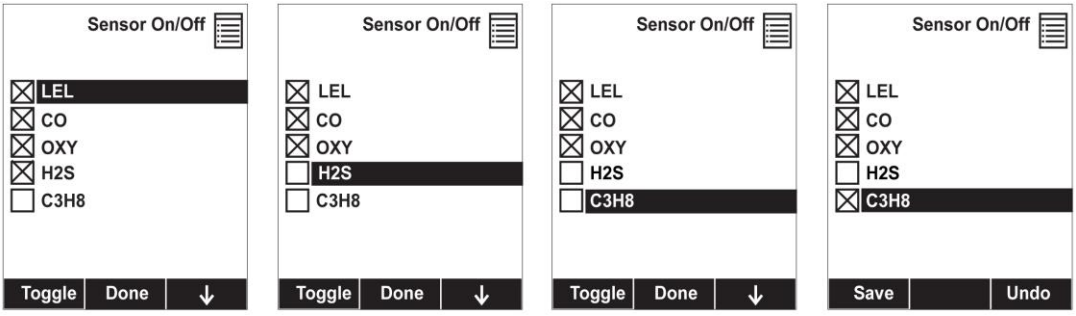


9.3.3.1 Sensor On/Off

You can turn sensors on or off via this submenu. An "X" in a box to the left of a sensor's name indicates it is turned on.

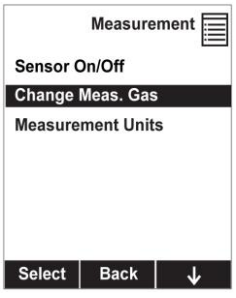


1. Scroll down the list of sensors using the [N/-] key.
2. Add or remove that gas from the list by pressing [Y/+]. An "X" in a box to the left of a sensor's name indicates it is selected.
3. Once you have made all your selections, press [MODE] for "Done."



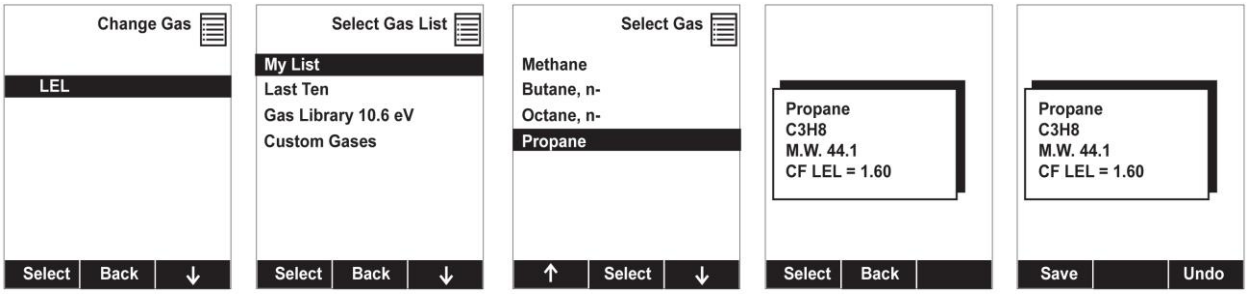
9.3.3.2 Change Meas. Gas

The MultiRAE MX has extensive onboard gas libraries for combustible gases that you can use to configure your MultiRAE MX to automatically apply the appropriate correction factors and produce readings in the units of the desired combustible gas.



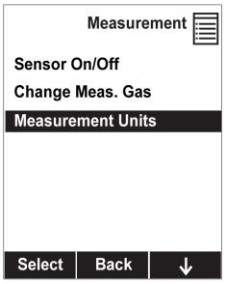
Measurement gases are organized in four lists:

- **My List** is a customized list of gases that you create. It contains a maximum of 10 gases and can only be built in ProRAE Studio II on a PC and transferred to the instrument.
- **Last Ten** is a list of the last ten gases used by your instrument. The list is built automatically and is only updated if the gas selected from Custom Gases or Library is not already in the Last Ten. This ensures that there is no repetition.
- **Gas Library** is a library that consists of more than 50 gases for the catalytic LEL sensor.
- **Custom Gases** are gases with user-modified parameters. Using ProRAE Studio II, all parameters defining a gas can be modified, including the name, span value(s), correction factor, and default alarm limits.



9.3.3.3 Measurement Units

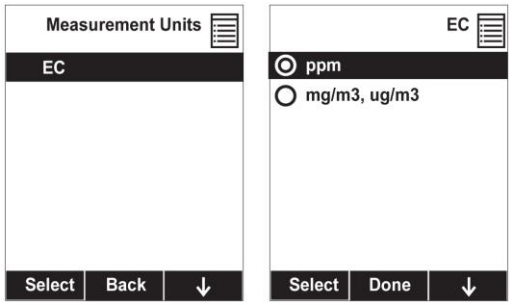
In some cases, the measurement unit for displaying data from sensors can be changed.



Standard available measurement units include:

Abbreviation	Unit	Sensor Type
ppm, mg/m3	parts per million, milligrams per cubic meter	EC (electrochemical)
%VOL only	percent by volume	C3H8 (NDIR)

Here is an example of menu hierarchies (select the sensor type and then the measurement unit):



9.3.4 Alarms

Use this menu to change high, low, STEL, and TWA alarm limits - the points at which alarms are triggered. It can also change alarm mode (latched or automatic reset) and alarm output methods (combinations of light, buzzer, and vibration alarm indications).

9.3.4.1 Alarm Limits

There are four groups of alarm settings that you can adjust for each individual sensor for which a particular alarm type is available.

Settings:

- High Alarm
- Low Alarm
- STEL Alarm
- TWA Alarm

Note: Some alarm settings are not applicable to all sensors. If a setting is irrelevant to a sensor, then that sensor does not appear in the list.

9.3.4.2 Alarm Mode

You can program the MultiRAE MX so that there are two ways to shut off an alarm:

Auto Reset	When the alarm condition is no longer present, the alarm stops and resets itself.
Latch	You can manually stop the alarm when one is triggered. The latched setting only controls alarms for High Alarm, Low Alarm, STEL Alarm, and TWA alarm.

Note: To clear an alarm when the instrument is set to "Latched," press [Y/+] when the main (measurement) display is shown.

Note: After an alarm is shut off, the instrument requires 1 second to refresh.

9.3.4.3 Alarm Settings

You can enable/disable any combination of light (LEDs), buzzer, and vibration alarms.

Settings:

- All Enabled
- Light
- Vibration
- Buzzer
- Buzzer & Light
- Buzzer & Vibration
- Vibration & Light
- All Disabled

9.3.4.4 Comfort Beep

A Comfort Beep is a single beep of the audible alarm at 60-second intervals that reminds the person using the MultiRAE MX that it is functioning. It can be turned on or off.

9.3.4.5 Man Down Alarm

The Man Down Alarm is a critical and potentially lifesaving safety feature of every MultiRAE MX. The Man Down Alarm is based on the premise that if the instrument is motionless when it is not supposed to be, something wrong may be happening to its user. If that is the case, the MultiRAE MX not only goes into alarm locally on the instrument, but also remotely, over the RAE Systems Dedicated Wireless Network, to notify people in the vicinity, as well as remote safety officers at a command center, that a person is down, so that help can be dispatched quickly.

Whenever the Man Down feature is on, the main screen displays a Man Down icon along the top to indicate it is active:

The MultiRAE MX has a 3D gravity sensor that can track the slightest motion of the instrument in any direction. If the instrument is not moved during that time, then a pre-alarm is activated to alert the user, and shows the "Are You OK?" screen. Pressing [Y/+] clears the alarm and returns the MultiRAE MX to its normal operation. Pressing [N/-] sets it into Man Down Alarm (and if wireless connectivity is enabled, a Man Down message is sent in real time to remote observers). If neither key is pressed, then after the count-down, it goes into Man Down Alarm (again sending a message to remote observers if wirelessly enabled).

Settings are available for:

- Off/On
- Motionless Time (time the instrument is motionless before initiating a pre-alarm)
- Motion Sensitivity (set to low, medium, or high to compensate for ambient vibration or motion)
- Warning Time (countdown, in seconds, from pre-alarm to Man Down alarm)

When the Man Down alarm is activated, the buzzer sounds and LEDs flash continuously, and a countdown begins.

- If the MultiRAE MX's user presses [Y/+] for "Yes" in response to the "Are You OK?" question on the screen before the countdown reaches zero, the Man Down alarm stops and the main reading screen is displayed.
- If the person does not press [Y/+] for "Yes" in response to the "Are You OK?" question on the screen before the countdown reaches zero, the Man Down alarm is sounded and LEDs flash continuously.
- If the person presses [N/-] during the countdown, answering the "Are You OK?" question with "No," the Man Down alarm starts.

If wireless connectivity is enabled, a Man Down message is also sent to remote observers.

IMPORTANT!

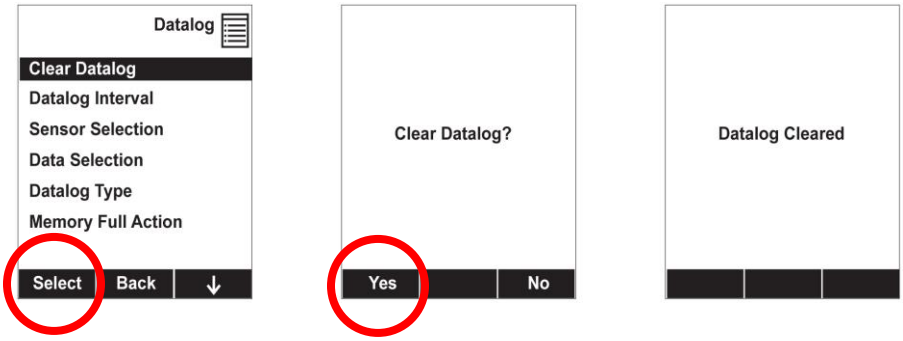
When gas or radiation alarm conditions exist at the same time as the Man Down is activated, the pre-alarm stage is skipped and the instrument goes straight into a Super Alarm (gas or radiation and Man Down) with four beeps/flashes per second.

9.3.5 Datalog

The instrument displays a floppy disk icon to indicate that a datalog is being recorded. The instrument stores the measured gas concentration for each sensor, date and time for each measurement, Site ID, User ID, and other parameters. The MultiRAE MX memory is sufficient to record six months' worth of data for five sensors at one-minute intervals, 24/7. All data are retained (even after the unit is turned off) in non-volatile memory so that they can be downloaded at a later time to a PC.

9.3.5.1 Clear Datalog

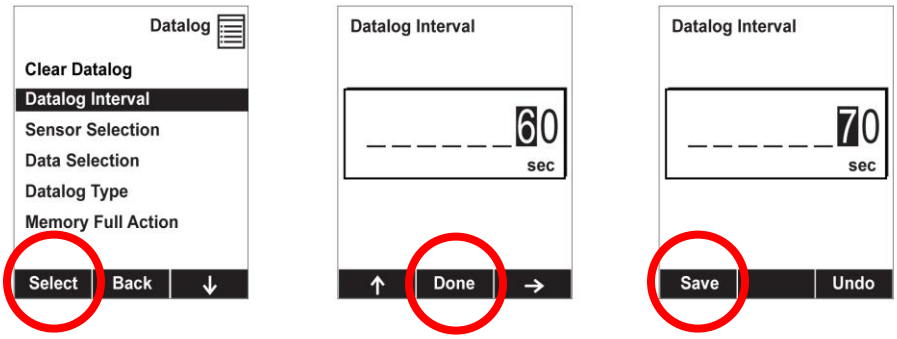
This operation erases all data stored in the datalog. Select "Clear Datalog," and then "Yes."



Note: Once the datalog is cleared, the data cannot be recovered.

9.3.5.2 Datalog Interval

Intervals are shown in seconds. The default value is 60 seconds. The maximum interval is 3600 seconds, and the minimum is 1 second.



9.3.5.3 Sensor Selection

You can choose which sensors' data are included in the datalog. The entire list of installed sensors is shown, and you can individually select whether their data is included.

Note: Turning a sensor off in the list does not change or erase its settings.

9.3.5.4 Data Selection

Data Selection allows you to select which types of data are stored and made available when you download your datalog to a computer via ProRAE Studio II (version 1.04 or higher) software.

You can choose any or all of four types of data (you must choose at least one):

- Minimum
- Average
- Maximum
- Real Time

9.3.5.5 Datalog Type

The instrument offers three options for starting the datalogging process:

Auto	Automatically collects datalog information every time the instrument is sampling until the datalog memory is full.
Manual	Datalogging occurs only when you manually initiate it (see below for details).
Snapshot	Captures a single event when you press [MODE].

Note: You can only choose one datalog type to be active at a time.

About Manual Datalogging

When the instrument is set to Manual Datalog, you can turn datalogging on and off by repeatedly pressing [N/-] and stepping through the screens from the main display until you reach the screen that says "Start Datalog?"

- When you reach the screen that says "Start Datalog?" press [Y/+] to start it. You see "Datalog Started," confirming that datalogging is now on. You can turn it off by pressing [Y/+] again.
- If datalogging is running, you can leave it running. However, if you want to turn it off, follow this procedure:

  Press [N/-] repeatedly to step through the screens until you reach the screen that says, "Stop Datalog?" Press [Y/+] to stop datalogging. The screen displays "Datalog Stopped" for a few seconds, before displaying "Start Datalog?" and the datalog interval. You can restart it anytime by pressing [Y/+] from that screen.

About Snapshot Datalogging

When the instrument is in Snapshot datalogging mode, it captures a single "snapshot" of the data at the moment of your choosing. All you have to do is press [MODE] each time you want to capture a snapshot of the data at that instant.

No snapshot.

Press [MODE] for a snapshot.

Datalog icon is shown momentarily during a snapshot

9.3.5.6 Memory Full Action

When the internal datalog memory is full, the MultiRAE MX can either stop collecting data (Stop when full) or go back to the beginning and overwrite the data from the first entry, second entry, etc. (Wraparound).

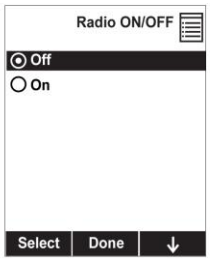
9.3.6 Wireless

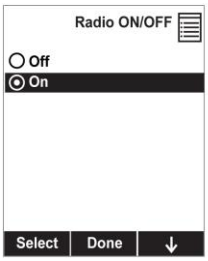
When a MultiRAE MX is equipped with a wireless modem, its settings are controlled via the menu items under "Wireless."

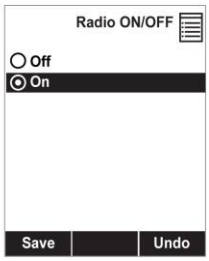
9.3.6.1 Radio ON/OFF

Turn the radio on or off via this menu.

1. Choose between "On" and "Off" by pressing [N/-].
2. Select the highlighted state by pressing [Y/+].
3. Save or register the change:
   - Press [Y/+] to save the change.
   - Press [N/-] to undo the change.



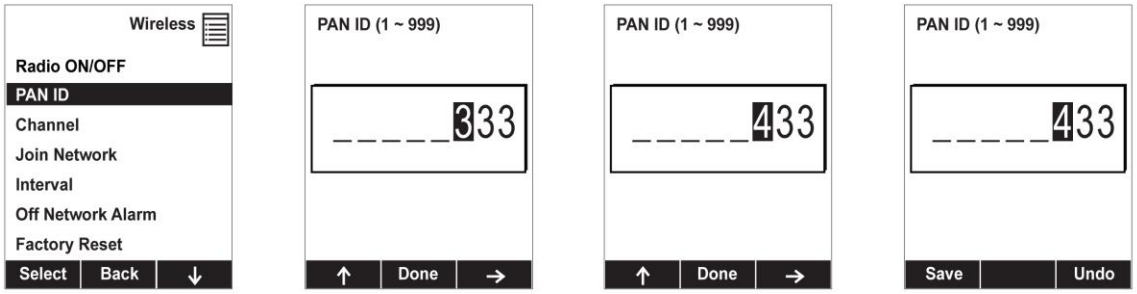




9.3.6.2 PAN ID

The MultiRAE MX and any other devices that you want to interconnect wirelessly must have the same PAN ID.

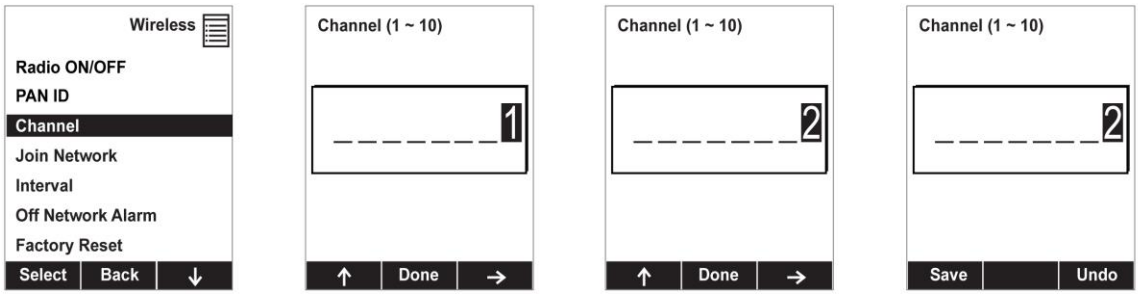
1. Press [Y/+] to increase the number and [N/-] to advance to the next digit.
2. After moving to the last digit and making changes, press [MODE].
   - Press [Y/+] to save the change.
   - Press [N/-] to undo the change.



9.3.6.3 Channel

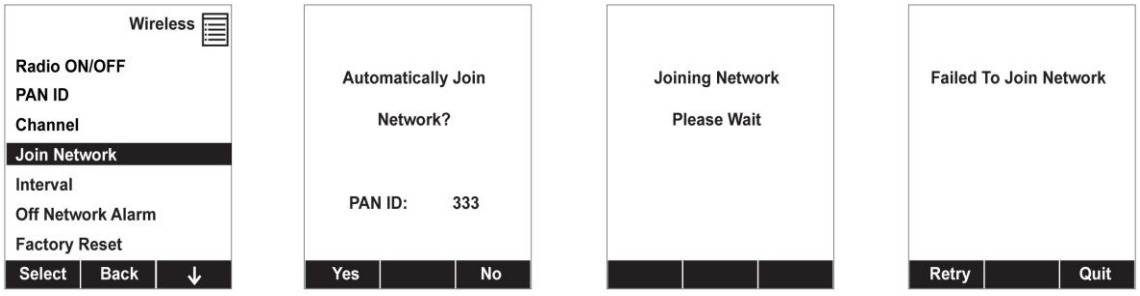
The MultiRAE MX and any other devices that you want to interconnect wirelessly must be operating on the same channel.

1. Press [Y/+] to increase the number and [N/-] to advance to the next digit.
2. After moving to the last digit and making changes, press [MODE].
   - Press [Y/+] to save the change.
   - Press [N/-] to undo the change.



9.3.6.4 Join Network

You can tell the MultiRAE to automatically join a network with a certain PAN ID without having to specify the communications channel. The PAN ID is shown for reference (if it is incorrect, you can change it, as described above). Press [Y/+] to join.



While it is searching for a network to join, the display shows this message:

Joining Network
Please Wait

If it is unsuccessful, you will see this message:

Failed To Join Network

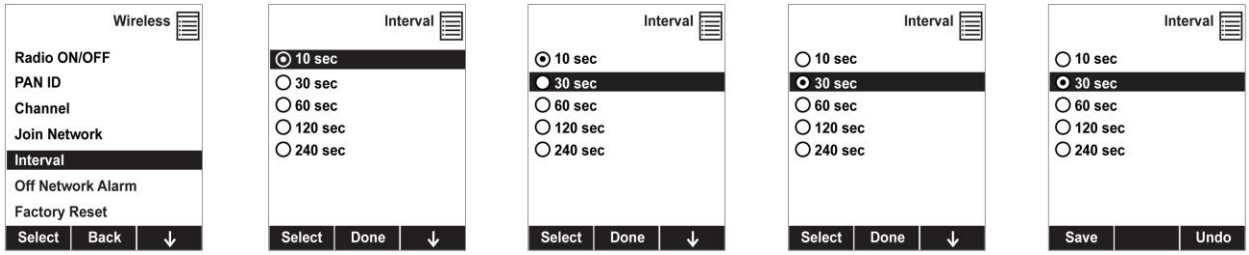
Check your other settings, as well as those of the network you are trying to join.

You can press [Y/+] to retry or [N/-] to quit.

9.3.6.5 Interval

This menu allows you to change the interval between wireless transmissions. The interval can be set to 10, 30, 60, 120, or 240 seconds.

1. Scroll down the list of intervals by pressing [N/-] until the interval you want is highlighted.
2. Select the highlighted interval by pressing [Y/+].
3. Save or register the change:
   - Press [Y/+] to save the change.
   - Press [N/-] to undo the change.

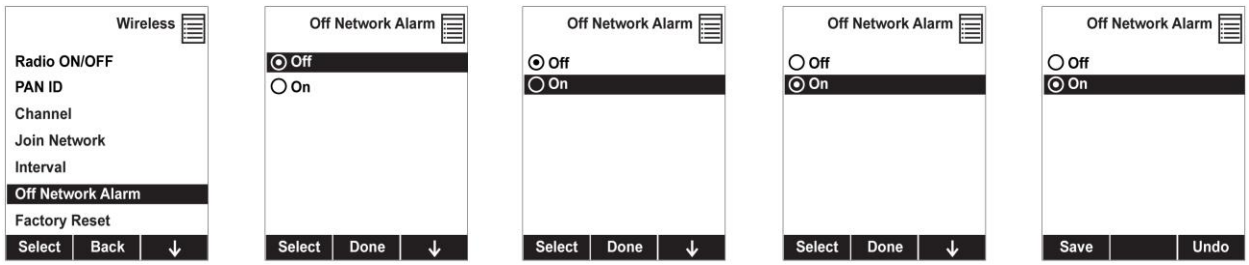


Note: The default interval is 30 seconds.

9.3.6.6 Off Network Alarm

If you would like the MultiRAE MX to notify you when it loses connection with a network, turn this on.

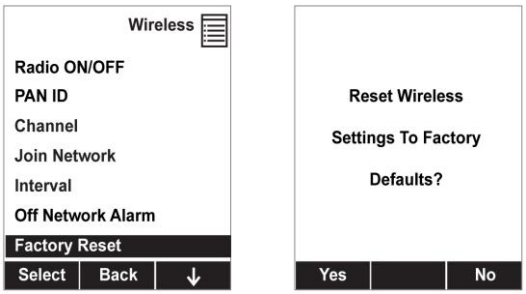
1. Choose between "On" and "Off" by pressing [N/-].
2. Select the highlighted state by pressing [Y/+].
3. Register the change.
   - Press [Y/+] to save the change.
   - Press [N/-] to undo the change.



9.3.6.7 Factory Reset

Restore all the wireless settings to their original factory defaults.

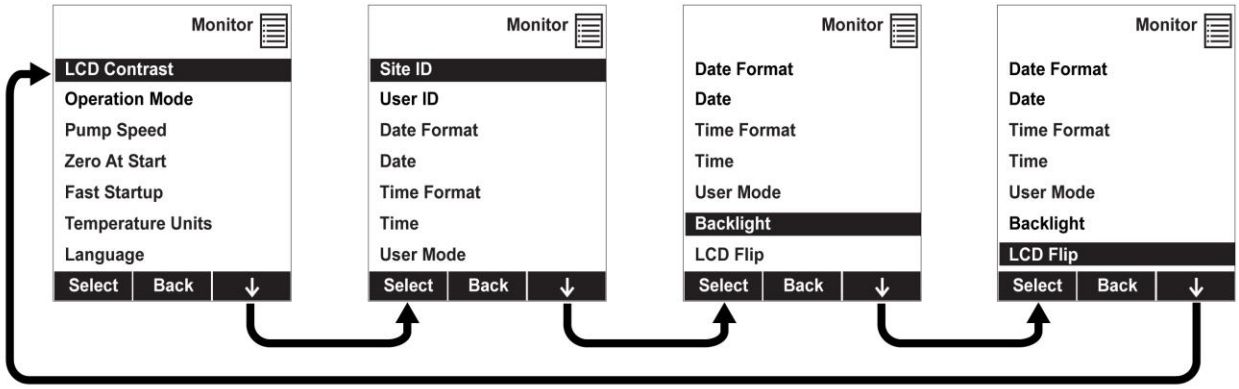
Caution! Once you reset the wireless settings, you cannot retrieve any of the settings deleted by performing this reset.



- Press [Y/+] to reset the wireless settings.
- Press [N/-] to exit without resetting the wireless settings.

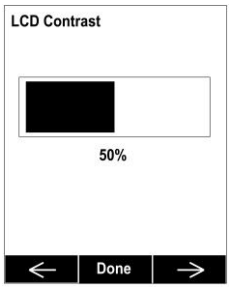
9.3.7 Monitor

The submenus under "Monitor" control the LCD's contrast, operation mode, pump speed, and other parameters. Press [N/-] to advance through the submenus, and when you reach the last one, it returns to the first selection.



9.3.7.1 LCD Contrast

The display's contrast can be increased or decreased from its default setting. You may not need to ever change the default setting, but sometimes you can optimize the display to suit extreme temperature and ambient brightness/darkness conditions.



Use the [Y/+] and [N/-] keys to decrease or increase LCD contrast, respectively (the bar graph aids in setting it). When you are done, press [MODE] to select "Done." If you have not made a change, it exits to

the submenu's next selection. If you have made a change, you are prompted at the next screen to press [Y/+] to save the change or [N/-] to undo the change and exit to the next submenu selection.

9.3.7.2 Operation Mode

There are two operation modes, outlined below.

Hygiene Mode

When the MultiRAE MX is in Hygiene Mode, it continuously monitors, and if datalogging is on, it saves data continuously.

Search Mode

When the instrument is in Search Mode, it only samples when you activate sampling. When you see the display that says, "Ready…Start sampling?" press [Y/+] to start. The instrument automatically assigns a new Site ID to each measurement you take. The pump turns on and the instrument begins collecting data. To stop sampling, press [N/-] while the main display is showing. You will see a new screen that says, "Stop sampling?" Press [Y/+] to stop sampling. Press [N/-] if you want sampling to continue.

9.3.7.3 Pump Speed

If the MultiRAE MX is equipped with a pump, the pump can operate at two speeds, high and low. Running at low speed is quieter, extends pump lifespan, and conserves a small amount of power. There is almost no difference in sampling accuracy.

9.3.7.4 Zero At Start

If your MultiRAE MX has been configured to perform a zero (fresh air) calibration upon startup, called Zero At Start, then the startup routine is interrupted so that you can perform a fresh air calibration for all sensors prior to using the instrument.

If you do not want to perform a zero calibration, press [MODE] to bypass it. If you start a zero calibration and want to abort it, press [N/-], and the calibration stops and the main display is shown.

9.3.7.5 Fast Startup

Fast Startup reduces the amount of time between when the instrument is turned on and is ready for use. It skips showing you many settings and is best suited to environments where the MultiRAE MX is turned on and off very often during a given day. If Fast Startup is not selected, then when the instrument starts, it shows you details of each sensor, including calibration information, high and low alarm settings, etc.

9.3.7.6 Temperature Units

The display unit of the internal temperature sensor can be switched between Fahrenheit and Celsius.

9.3.7.7 Language

English is the default language, but other languages can also be selected for the instrument.

9.3.7.8 Site ID

Choose and enter an 8-digit Site ID to uniquely identify the particular site where the instrument is to be used. The first four digits can be an alphabet letter or number, while the last four digits can only be numbers. This Site ID is included in the datalog report.

Note: Advance through the alphabet and numbers (0 through 9) by one with each press of the [Y/+] key. To scroll quickly, hold down the [Y/+] key for as long as you want it to scroll rapidly.

9.3.7.9 User ID

Enter an 8-digit alphanumeric User ID to uniquely identify a user. This User ID is included in the datalog report. The first four characters of a customized User ID act as an identifier for the monitor on the screen of the EchoView Host Wireless Mini-Controller to which the MultiRAE MX is wirelessly connected.

Note: Advance through the alphabet and numbers (0 through 9) by one with each press of the [Y/+] key. To scroll quickly, hold down the [Y/+] key for as long as you want it to scroll rapidly.

9.3.7.10 Date Format

Month (MM) and Day (DD) have two digits each, while the year (YYYY) uses four digits. The Date can be expressed in three different formats:

- MM/DD/YYYY
- DD/MM/YYYY
- YYYY/MM/DD

9.3.7.11 Date

Set the date according to the format selected in Date Format.

9.3.7.12 Time Format

The time format can be either of these two options:

- 12 Hour (AM/PM)
- 24 Hour

9.3.7.13 Time

Regardless of the Time Format you select, the MultiRAE's time must be set using the 24-hour format, following hours, minutes, and seconds (HH:MM:SS).

9.3.7.14 User Mode

Two User Modes are available: Advanced and Basic. The Advanced User Mode allows a greater number of parameters to be changed than Basic User Mode. It can be used with either of the Operation Modes, Hygiene or Search. No password is required to enter the Programming Menu when in Advanced User Mode.

9.3.7.15 Backlight

The display's backlight can be set to illuminate either automatically, based on ambient light conditions, or manually, or it can be shut off. If manual backlighting is selected, when the backlight is turned off, pressing any key turns backlighting on. A key needs to be pressed again to perform its main function.

9.3.7.16 LCD Flip

The display can be configured to flip 180° automatically when the MultiRAE is turned upside-down. The LCD Flip feature can be set to On or Off.

10 Policy Enforcement

The MultiRAE MX can be configured to enforce a facility/company's requirements that calibration and/or bump testing be performed at specified intervals, and to explicitly prompt the user that calibration/bump testing is required. Depending on how Policy Enforcement features are configured, the user may be required to perform a bump test or calibration prior to being able to use the instrument. That is, it can be set to not allow normal operation of the instrument unless calibration or bump testing is performed.

If the instrument has been bump tested and calibrated in compliance with the policy settings, a check-mark icon is included along the top of the MultiRAE MX screen:

If Policy Enforcement is enabled, then after startup the MultiRAE MX displays a screen that informs the user that the instrument requires either a bump test or a calibration. If both are required, then they are shown in sequence.

Note: Policy enforcement features are disabled by default.

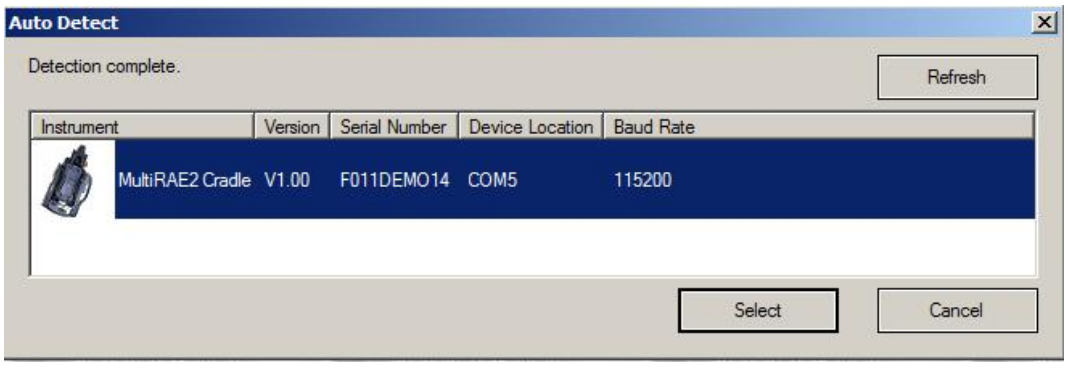
10.1 Setting Policy Enforcement

You must use ProRAE Studio II to make changes to Policy Enforcement settings. The procedure differs, depending on whether you are using an AutoRAE 2 Cradle or a MultiRAE MX Travel Charger. Policy violations are captured in the datalog.

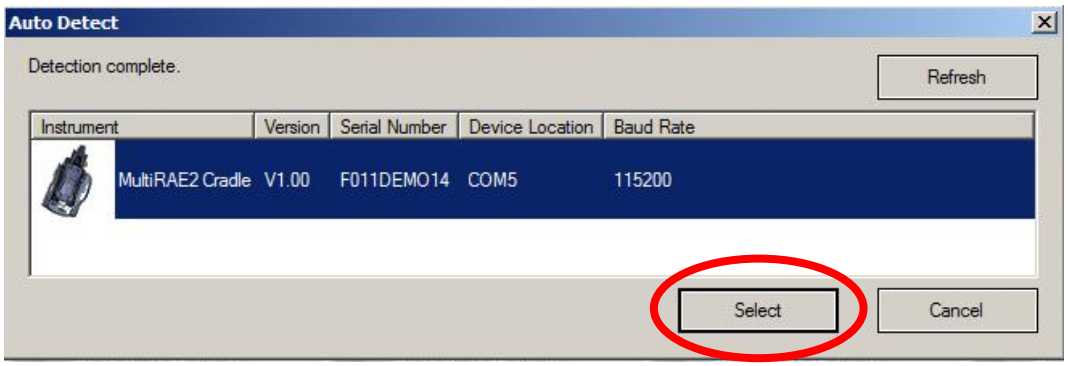
10.1.1 Using The AutoRAE 2 Automatic Test And Calibration System

To program a MultiRAE MX via an AutoRAE 2, you need ProRAE Studio II Instrument Configuration and Data Management Software, the AutoRAE 2 connected to a power source, and a USB PC communications cable.

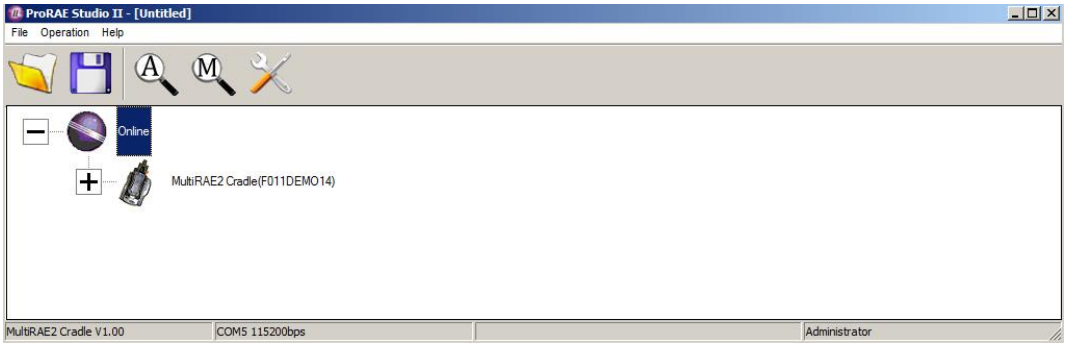
1. Connect a USB cable between a PC with ProRAE Studio II and the AutoRAE 2.
2. Apply power to the AutoRAE 2.
3. Turn off the MultiRAE MX (or put it into AutoRAE 2 Mode) and set it in the cradle.
4. Start ProRAE Studio II software on the PC.
5. Select "Administrator" and input the password (the default is "rae").
6. Click "Detect the instruments automatically" (the magnifying glass icon with the letter "A" in it). After a few seconds, the AutoRAE 2 Cradle is found and it is shown, along with its serial number:



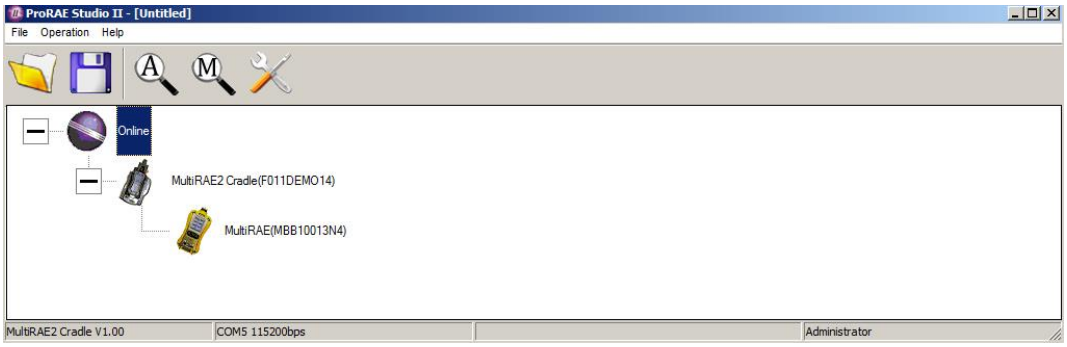
7. Click on the icon to highlight it, and then click "Select."



8. In ProRAE Studio II, the AutoRAE 2 Cradle is shown, including its Serial Number, under "Online":

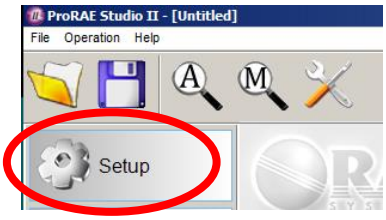


9. Expand the view to show the MultiRAE MX in the AutoRAE 2 Cradle by clicking the "+" to the left of the image of the AutoRAE 2 Cradle:

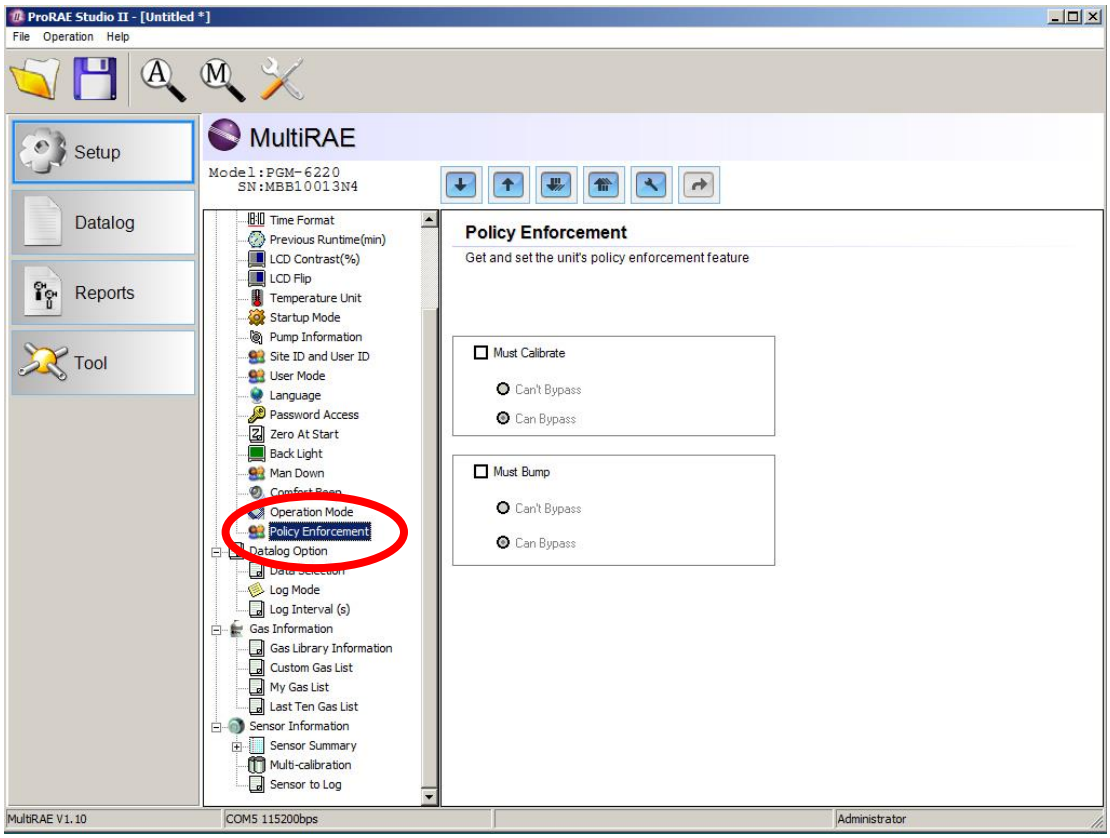


10. Double-click on the icon representing the MultiRAE MX.

11. Click "Setup."



12. In the menu that now appears on the left side, click "Policy Enforcement." It is highlighted, and the Policy Enforcement pane is shown:



For "Must Calibrate" and "Must Bump," you have the options of no enforcement or enforcement (including "Can't Bypass," and "Can Bypass").

Must Calibrate. The user is prompted to calibrate the instrument when calibration is due (as set by the calibration interval). There are two programmable options:

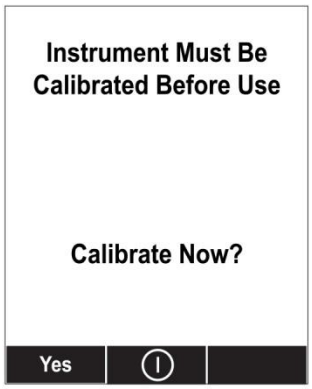
- **Can't Bypass.** Unless calibration is performed, the instrument cannot be used, and the only option is to turn off the instrument.
- **Can Bypass.** If calibration is due but the user does not want to perform a calibration, the instrument can still be used. In this case, the instrument records that the user has bypassed the calibration requirement in a Policy Violation report.

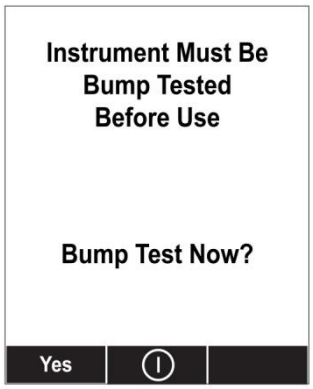
Must Bump. The user is prompted to bump test the instrument when a bump test is due (as set by the bump test interval). There are two programmable options:

- **Can't Bypass.** Unless a bump test is performed, the instrument cannot be used, and the only option is to turn off the instrument.
- **Can Bypass.** If a bump test is due but the user does not want to perform one, the instrument can still be used. In this case, the instrument records that the user has bypassed the bump testing requirement in a Policy Violation report.

These are the screens that are shown on a MultiRAE MX after startup if "Can Bypass" is selected:

If "Can't Bypass" is selected, the display looks like this, and only allows the options of performing the test or shutting down:





16. Once you have made your selections in ProRAE Studio II, you must upload the changes to the instrument. Click the icon labeled "Upload all settings to the instrument."

17. A confirmation screen is shown. Click "Yes" to perform the upload, or "No" to abort. Uploading takes a few seconds, and a progress bar is shown. You can abort the upload by clicking "Cancel."

18. Exit ProRAE Studio II.

19. Press [Y/+] on the MultiRAE MX to exit Communication Mode.

10.1.2 Using The MultiRAE MX Travel Charger

Make sure the AC adapter is connected and that a USB cable is connected to a computer running ProRAE Studio II.

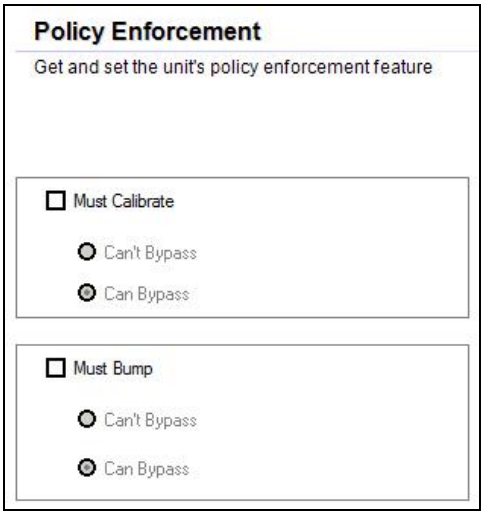
1. Turn on the MultiRAE MX.
2. Hold down [MODE] and [N/-] to enter Programming Mode.
3. Provide the password.
4. Press [N/-] until "Enter Communications Mode?" is displayed.
5. Press [Y/+]. The screen shows three options:

   - PC
   - AutoRAE 2
   - Exit

6. With "PC" highlighted, press [Y/+] to select it.
   The screen now displays: "Ready To Communicate With Computer."

7. Start ProRAE Studio II.
8. Select "Administrator."
9. Input the password (the default is "rae").
10. Click "OK."
11. Click "A" (detects instruments automatically).
12. Click on the instrument's icon when it appears to highlight it.
13. Click "Select."
14. Click "Setup."
15. Click "Policy Enforcement."

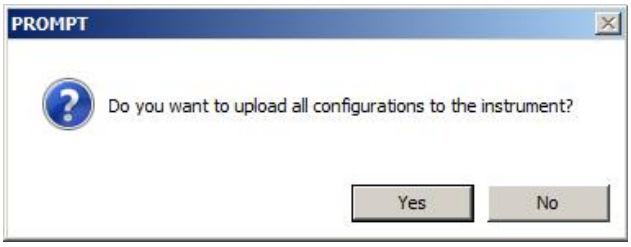
The Policy Enforcement pane is shown:



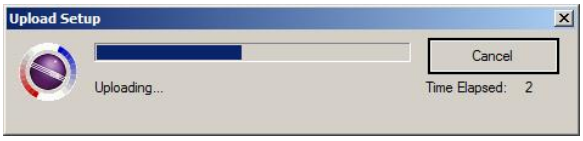
You can select "Must Calibrate" and/or "Must Bump" and then set whether the user must perform the selected operation in order to use the instrument.

16. Once you have made your selections in ProRAE Studio II, you must upload the changes to the instrument. Click the icon labeled "Upload all settings to the instrument."

17. A confirmation screen is shown. Click "Yes" to perform the upload, or "No" to abort.



Uploading takes a few seconds, and this progress bar is shown. You can abort the upload by clicking "Cancel."



18. Exit ProRAE Studio II.
19. Press [Y/+] on the MultiRAE MX to exit Communication Mode.

10.2 Deactivating Policy Enforcement

10.2.1 AutoRAE 2 Cradle

To deactivate Policy Enforcement when using an AutoRAE 2 Cradle, follow the procedure for changing settings. See page 47 for details.

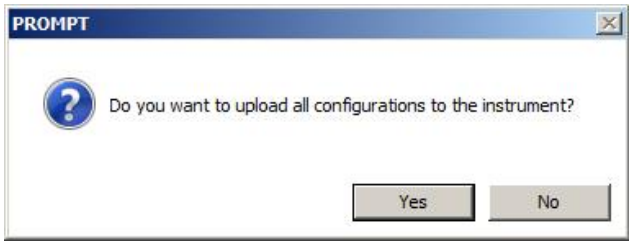
10.2.2 MultiRAE MX Travel Charger

If the MultiRAE MX screen displays the message that it must be bump tested or calibrated, and if the option to bypass bump testing or calibration is not available, you should shut off the instrument and follow the procedure outlined here if you want to change the Policy Enforcement settings:

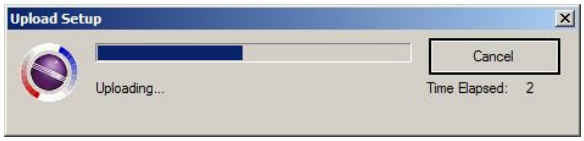
1. Use a USB cable to connect the MultiRAE MX in its Travel Charger to a computer running ProRAE Studio II.
2. Enter Diagnostic Mode on the MultiRAE MX (with the instrument turned off, press and hold [Y/+] and [MODE] until it starts up.
3. After startup, enter the password when prompted (default is "0000") and press [MODE].
4. Press [N/-] repeatedly until you see the "Enter Communications Mode?" screen.
5. Press [Y/+] to enter Communications Mode.

6. Start ProRAE Studio II.
7. Select "Administrator."
8. Input the password (the default is "rae").
9. Click "OK."
10. Click "A" (detect instruments automatically).
11. Click on the instrument's icon when it appears.
12. Click "Select."
13. Click "Setup."
14. Click "Policy Enforcement." The Policy Enforcement pane is shown.
15. Deselect Policy Enforcement features you do not wish to use.
16. Click "Upload all settings to the instrument."

17. When you see this confirmation. Click "Yes."



Uploading will take a few seconds, and this progress bar is shown:



18. When the upload is done, exit ProRAE Studio II.
19. Press [Y/+] on the MultiRAE MX to exit Communication Mode.

11 Calibration And Testing

11.1 Manual Alarms Test

Under Normal Operation Mode and non-alarm conditions, the buzzer (audible alarm), vibration, visible alarms, and backlight can all be tested anytime by pressing [Y/+] twice. If any alarm does not respond, check the alarm settings in the Programming Menu to make sure all alarms are enabled (selected setting under Programming/Alarms/Alarm Settings should be "All Enabled"). If any alarms are enabled but not functional, the instrument should not be used.

11.2 Bump Testing And Calibration

RAE Systems recommends that a bump test be conducted prior to each day's use. The purpose of a bump test is to ensure that the instrument's sensors respond to gas and all the alarms are enabled and functional.

- The MultiRAE MX multi-gas detector must be calibrated if it does not pass a bump test when a new sensor is installed, after sensor maintenance has been performed, or at least once every 180 days, depending on use and sensor exposure to poisons and contaminants.
- Calibration and bump test intervals and procedures may vary due to national legislation.

A bump test or calibration can be performed either manually or using the AutoRAE 2 Automatic Test and Calibration System. When a bump test or calibration is done manually, the instrument makes a pass/fail decision based on sensor performance, but the user still has the responsibility to make sure all the alarms are enabled and functional.

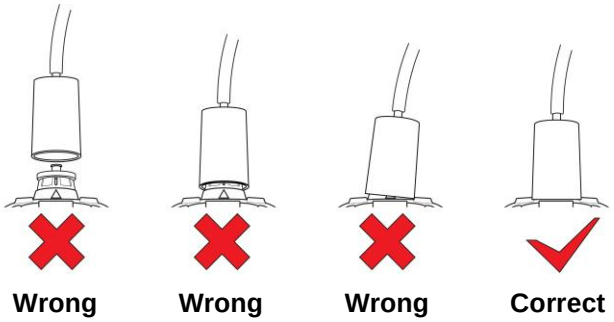
An AutoRAE 2 bump test or calibration takes care of both the sensor and alarm tests. Consult the AutoRAE 2 User's Guide for details.

11.2.1 Flow Rate & Calilbration Adapter (Pumped)

With its pump speed setting of low or high, a MultiRAE MX normally draws in air at a flow rate of between 200 cc/min and 300 cc/min. RAE Systems recommends that a calibration cap used with calibration gas flow rates from 500 cc/min to 1000 cc/min.

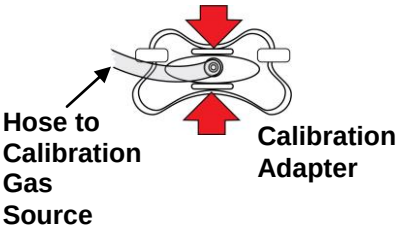
Installing The Calibration Adapter

WARNING: Make sure the calibration cap clips on and stays in the correct position during calibration, as illustrated below. Otherwise, the calibration cap must be manually held in the correct position.

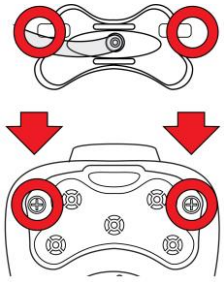


11.2.2 MultiRAE MX Diffusion Model (No Pump)

Because there is no single inlet on the diffusion (non-pumped) version of the MultiRAE MX, a Calibration Adapter is used for supplying calibration gas to all sensors at one time. Follow these steps for attaching the Calibration Adapter.



Grasp the small handles on the Calibration Adapter.



Align the Calibration Adapter's two connectors with the screws on both sides of the MultiRAE MX's gas inlets.

Make sure the connectors are securely in place before starting the flow of calibration gas. (The Calibration Adapter has small grooves on its underside to allow gas to escape after passing over the sensors.

11.2.3 Bump (Functional) Testing

A bump test can be performed on an individual sensor (Single Sensor Bump) or a group of sensors (Multi Sensor Bump) combined into Multi Cal. Select. The same gas is used for a bump test as for calibration. Typically, two cylinders of calibration gas are needed to perform a bump test or calibration on an instrument with electrochemical and LEL sensors. This may require one gas cylinder with Isobutylene, and another with a 4-gas mix to test electrochemical (such as CO, H_2S, and O_2) and LEL sensors. As with calibration, the instrument intelligently splits the process into two consecutive steps: the wizard prompts for testing electrochemical and LEL sensors.

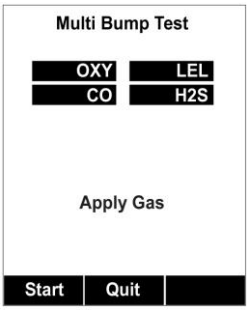
For a manual bump test, a constant-flow regulator producing 0.5 to 1 liters per minute should be used, and the calibration cap must be installed on the instrument. Testing and calibration with an AutoRAE 2 must be performed using demand-flow regulators. A calibration cap must not be used. Follow the steps described here to perform a manual bump test:

1. Turn on your MultiRAE MX by pressing and holding [MODE] (the middle button) and allow the instrument to boot up fully until the main measurement screen with sensor names and readings is shown.

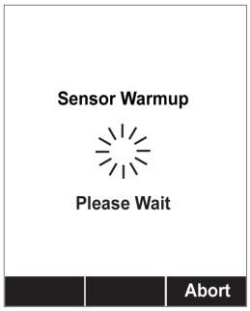
Important! Make sure all of the instrument's sensors have warmed up before performing the bump test. The instrument will take the time to warm up the sensors prior to enabling access to bump test menus. You can tell a sensor has warmed up if you see a reading next to it name on the display. If it has not warmed up, you see three dashes ("---") next to it.

2. Enter the Bump Test menu. It is accessible either through Programming Menu/Calibration or using the following easy shortcut:

   With the instrument running in Normal Mode and the main measurement screen shown, press both [Y/+] and [N/-] at the same time and hold them for 5 seconds. If all the sensors have warmed up, the Multi-Bump Test menu then appears:



   Otherwise, the menu appears after the warm-up is complete (while it is warming up, the screen indicates that you must wait for the sensors to warm up).



Note: If you do not apply gas within a couple of minutes, the screen changes briefly to indicate gas has not been applied, and then the instrument returns to its normal reading screen.

3. Install the calibration cap on the MultiRAE MX and connect it to the calibration gas. Turn on the gas to initiate flow.

4. Press [Y/+] to start the bump test. While the bump test is being performed, the readings for each sensor are shown. Once the bump test completes, pass/fail test results and readings are shown for each sensor.

   Note: If sensors are installed in the instrument require a dedicated cylinder of gas to calibrate, the instrument will prompt for calibrating such sensors at this point.

5. If sensors installed in the instrument require a dedicated gas cylinder to calibrate, the instrument will prompt to calibrate such sensors at this point. Disconnect the gas cylinder and connect the next.

   Note: If other installed sensors require a dedicated cylinder of gas to calibrate, the instrument prompts for calibrating these sensors at this point.

Important! If one or more sensors fails a bump test, be sure to calibrate those sensors.

6. The bump test is now complete. Press Exit to return to the main measurement screen.

7. Now perform a manual alarms test, as described on page 54.

If all the alarms and all sensors have passed and no sensor is due for a calibration, the instrument is now ready for use.

Note: When a manual bump test is performed, the readings shown are in the equivalent units of the calibration gas, and not the measurement gas (if different).

11.3 Zero/Fresh Air Calibration

This operation sets the zero point of the sensor calibration curve for clean air. It should be performed before other calibrations.

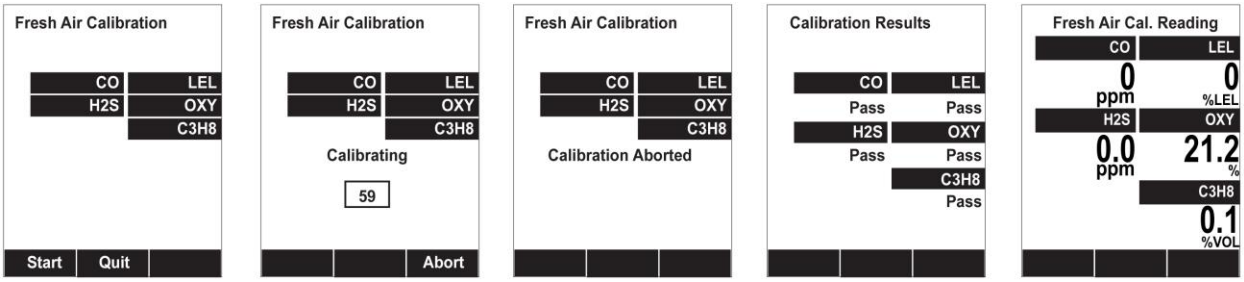
Note: If you use a zero air cylinder, you must use the MultiRAE MX Calibration Adapter. Using a calibration adapter is not necessary for calibration in fresh air.

11.3.1 Fresh Air Calibration

This procedure determines zero points of most sensors. The MultiRAE MX should be zero-calibrated in clean air with 20.9% oxygen or with a cylinder of clean zero air.

At the Calibration menu, select "Fresh Air" by pressing [Y/+] once to enter fresh air calibration.

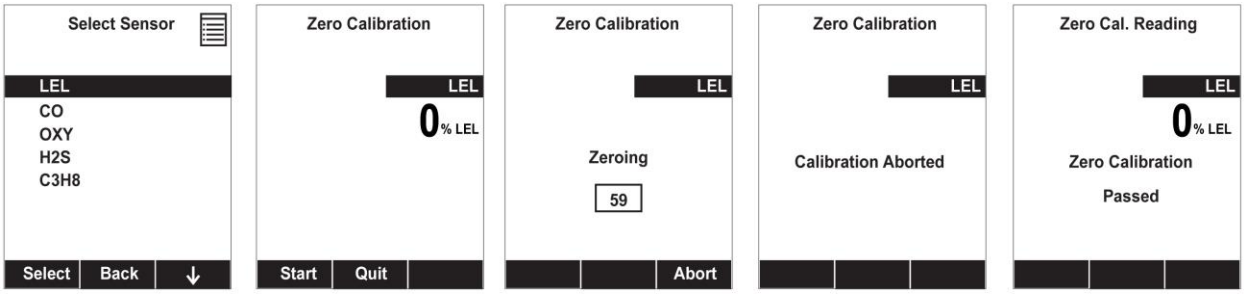
After a timer countdown, the zero calibration is done. The LCD displays the sensor names and tells you whether each calibration passed or failed, followed by the sensor readings.



Note: You can abort the calibration at any time during the countdown by pressing [N/-].

11.3.2 Single-Sensor Zero Calibration

Select the sensor and then start the calibration by pressing [Y/+]. You can abort the procedure anytime by pressing [N/-].



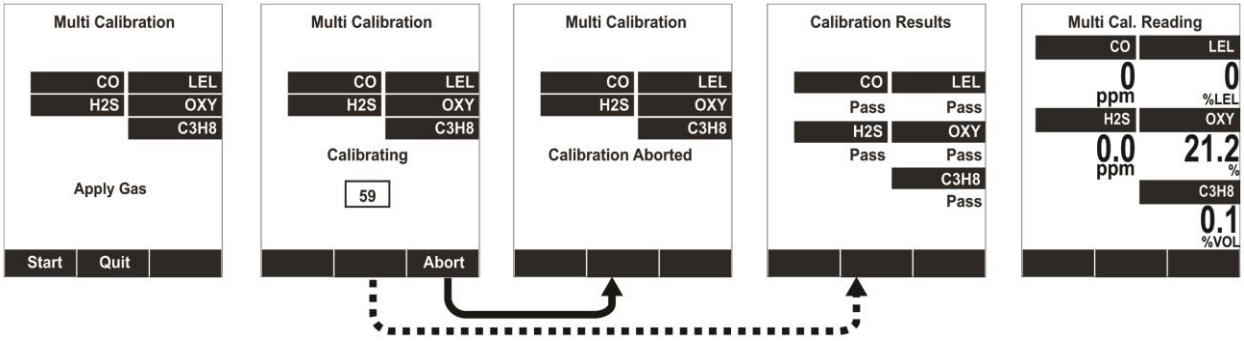
11.4 Span Calibration

This procedure determines the second point of the sensor calibration curve for the sensor.

Note: When a manual calibration is performed, the readings shown are in the equivalent units of the calibration gas, and not the measurement gas.

11.4.1 Multi-Sensor Span Calibration

This lets you perform a span calibration on multiple sensors simultaneously. It requires using the appropriate span gas and that the concentration labeled on the gas cylinder matches the concentration programmed in the MultiRAE MX.



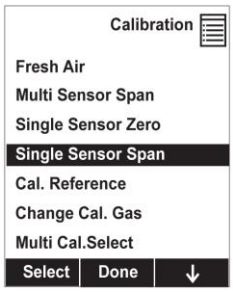
1. Attach the calibration adapter and gas to the MultiRAE MX.
2. Start the flow of gas and then press [Y/+] to begin calibration. A countdown screen is shown. You can abort the calibration at any time during the countdown by pressing [N/-].

If the calibration reaches its conclusion, it shows the sensor names and tells you whether the calibration passed or failed, followed by the sensor readings.

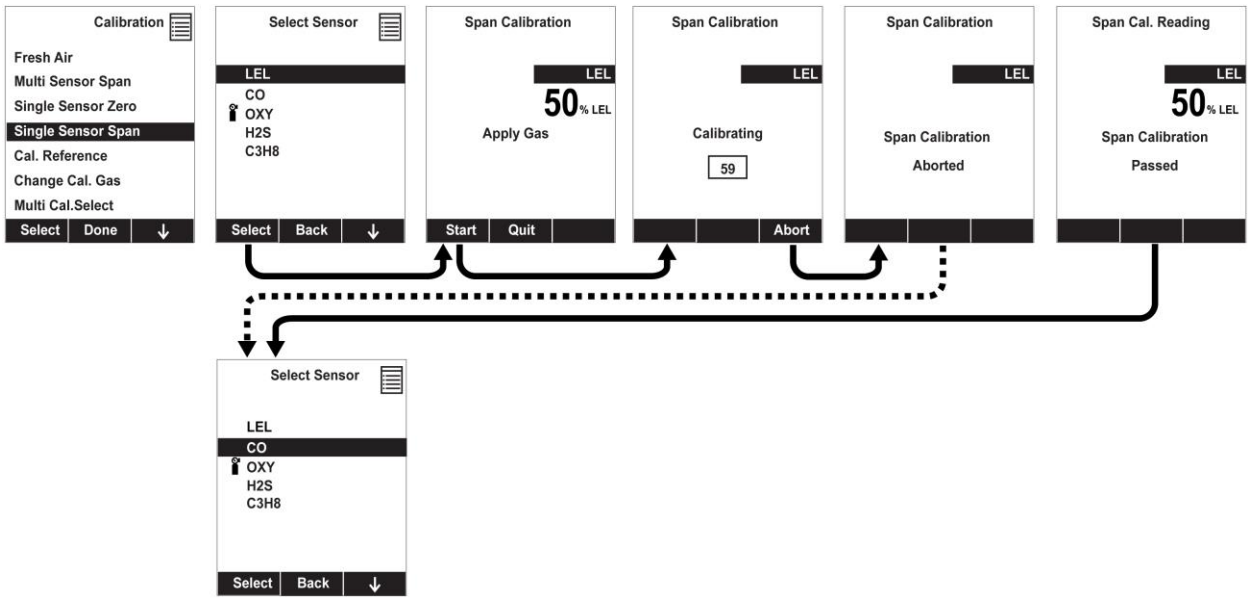
11.4.2 Single-Sensor Span Calibration

To perform span calibration of an individual sensor, follow these steps:

1. At the Calibration Menu, select "Single Sensor Span."
2. Select a sensor from the list.
3. Connect the calibration adapter and connect it to a source of calibration gas.
4. Start the flow of calibration gas.
5. Verify that the displayed calibration value meets the concentration label on the gas cylinder.



6. Press [Y/+] to start calibrating. You can abort the calibration at any time during the countdown by pressing [N/-].



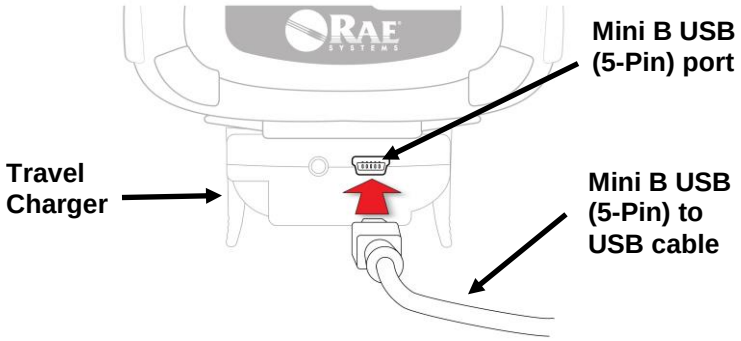
After a timer countdown, the span calibration is done. The LCD will display whether the calibration was successful and the reading for that calibration gas.

Note: If the sensor calibration fails, try again. If calibration fails repeatedly, turn off the instrument and then replace the sensor.

WARNING: Do not replace sensors in hazardous locations.

12 Datalog Transfer And Monitor Configuration

Datalogs can be downloaded from the MultiRAE MX to a computer via the USB port on the Travel Charger or AutoRAE 2. Use the included Mini B USB (5-pin)-to-USB cable to connect the Travel Charger to a computer running ProRAE Studio II or a USB A to USB B cable to connect the AutoRAE 2.



13 Downloading Datalogs And Performing PC-Based Instrument Configuration

The MultiRAE MX communicates with a PC running ProRAE Studio II Instrument Configuration and Data Management software to download datalogs or to configure the instrument.

Note: The most recent version of ProRAE Studio II Instrument Configuration and Data Management software is available for a free-of-charge download at:

http://www.raesystems.com/downloads/product-software

The MultiRAE MX must be connected to a PC through the supplied Travel Charger or AutoRAE 2 and must be in the PC or AutoRAE 2 communications mode.

Travel Charger

1. Use the supplied PC Communications Cable (USB to mini-USB cable) to connect the Travel Charger to a PC.
2. Turn on the MultiRAE MX. Make sure it is running in Normal mode (with the main measurement screen showing).
3. Connect the MultiRAE MX to the Travel Charger.
4. Activate the PC communications mode on the MultiRAE MX by pressing [N/-] repeatedly, starting from the main measurement screen until you reach the "Communicate With Computer?" screen.
5. Press [Y/+]. Measurement and datalogging stop, and the instrument is now ready to communicate with the PC. The display now says "Ready To Communicate With Computer."
6. Start up the ProRAE Studio II software, enter a password, and detect the instrument following the directions provided in the ProRAE Studio II User's Guide.
7. Follow the instructions in the ProRAE Studio II User's Guide to download the datalog, configure the instrument settings, or update the MultiRAE MX's firmware.
8. When you are done, press [Y/+] to exit the PC communications mode on the MultiRAE MX. The instrument returns to operating in Normal mode.

AutoRAE 2

1. Follow the instructions in the AutoRAE 2 User's Guide to connect the AutoRAE 2 and the PC using the included cable.
2. Make sure the monitor is either turned off or is in AutoRAE 2 Communications Mode.
3. Place the instrument into the cradle face-down, making sure that it is aligned correctly with the contacts on the AutoRAE 2 Cradle's charging port. There are two alignment points on one side and one alignment point on the other side, designed to mate with matching points on the bottom of the MultiRAE MX.
4. Press in on the capture mechanism to lock the MultiRAE MX in place.
5. Start up the ProRAE Studio II software, enter a password, and detect the instrument following the directions provided in the ProRAE Studio II User's Guide.
6. Follow the instructions in the ProRAE Studio II User's Guide to download the datalog, configure the instrument settings, or to update the MultiRAE MX's firmware.
7. When you are done, press [Y/+] to exit the AutoRAE 2 Communications Mode on the MultiRAE MX. The instrument returns to operating in Normal mode.

IMPORTANT!

After changing parameters by using an external PC, check that all settings are correct in one of the following ways:

- Check the parameter settings at the instrument.
- Read back the parameters from the instrument and manually verify received values.

14 Maintenance

The MultiRAE MX requires little maintenance, aside from replacing sensors, the filter, and the battery. If the instrument is equipped with a pump, it may need replacement, as well.

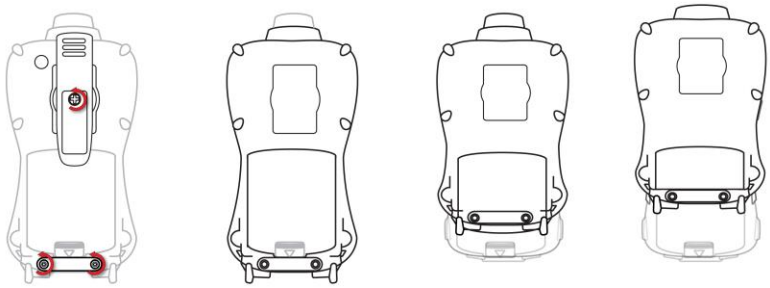
IMPORTANT!

After performing maintenance on the instrument, always restart it, especially if a self-test was not performed as part of the maintenance procedure.

14.1 Removing/Installing The Rubber Boot

In order to open the MultiRAE MX, it is necessary to remove the belt clip and the rubber boot. Note that there are two hex screws on the bottom rear side that secure the boot.

1. Remove the belt clip by unscrewing the Philips screw (pumped version only).
2. Remove the two hex screws located below the battery area.
3. Pull the bottom of the boot back over the rear side of the instrument.
4. Carefully slide the boot upward, and slide it over the D-ring and clamp.



14.2 Replacing The Filter(s)

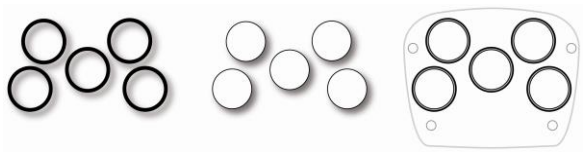
Pumped Version

If a filter is dirty or clogged, remove it by unscrewing it from the black gas inlet adapter. Discard it and replace it with a new filter. Perform a pump stall test to make sure the inlet and the external filter are installed properly so that there are no leaks in the system.

Diffusion Version

If the filters appear dirty, remove the sensor compartment cover to access them (this requires removing the rubber boot first).

Remove the four screws holding the sensor compartment cover in place.



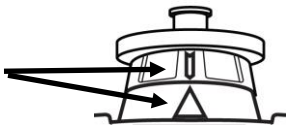
Remove the O-rings and then remove the filters. Replace them with new filters (press around the perimeter of each to ensure that the adhesive holds them firmly) and install the O-rings in their proper locations. O-rings may need to be replaced as well if they appear worn down, cracked, or dirty

Replace the sensor compartment cover and tighten the four screws.

14.3 Replacing The Gas Inlet Adapter (Pumped Versions Only)

When you remove the black gas inldet adapter, unscrew it in the same manner as the external filter. When replacing it, make sure that the arrow on the front points to the triangle on the rubber boot. Perform a pump stall test to make sure the inlet and the external filter are installed properly so that there are no leaks in the system.

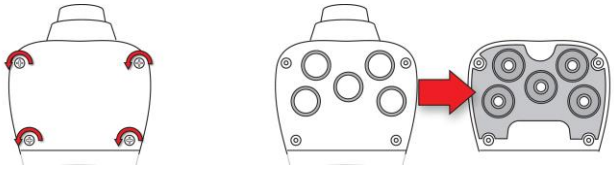
Match arrow on nozzle to triangle on rubber boot



14.4 Removing/Cleaning/Replacing Sensor Modules

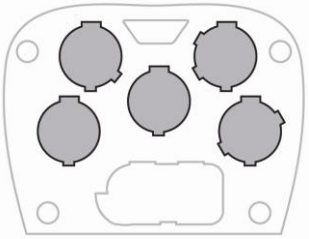
WARNING! Do not replace sensors in hazardous locations.

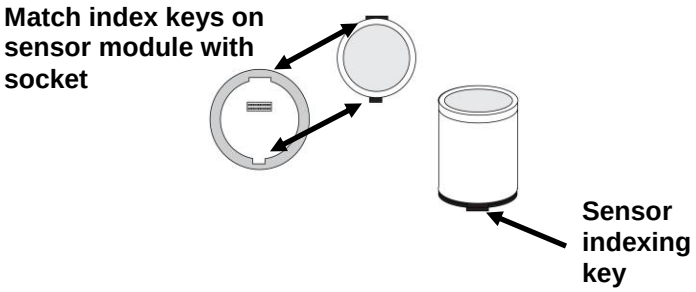
All sensors are located inside the sensor compartment in the upper half of the MultiRAE MX. They are accessed by removing the cover that is held on by four screws.



1. Turn off the instrument.
2. Remove the four screws holding the sensor compartment.

3. Remove the cover. The sensors are plugged into the slots.
4. Gently lift out the desired sensor module with your fingers.
5. Install the replacement sensor. It can only go into its slot one way. The connector inside the MultiRAE and the indexing guides are good visual indicators of how to set the sensor into position. Make sure the indexing keys are aligned and that the sensor is seated firmly.





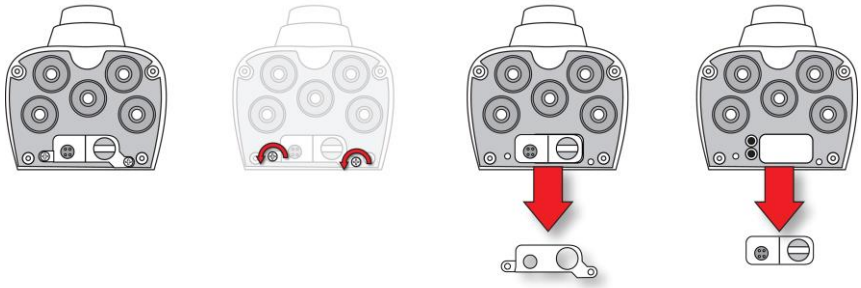
WARNING!

If you are removing a sensor and not replacing it, the slot cannot be left empty. A MultiRAE "dummy" sensor must be installed in any open slot.

14.5 Replacing The Pump

If your MultiRAE MX has a pump and it requires replacement, follow these steps. Make sure the battery is removed before proceeding.

1. Remove the rear cover.
2. The pump is held in place by a metal bracket and two Philips screws. Remove the two screws.
3. Lift off the metal bracket.
4. Pressing down on the gas plate with one hand, pull the pump straight out. It has an inlet and outlet that are held in the two holes with rubber gaskets to the left of the pump cavity.



5. Press a new pump into place (a small amount of wiggling helps), making sure that both the inlet and outlet from the pump go into the two holes.
6. Place the metal bracket over the pump.
7. Insert and tighten the two screws that attach the bracket to the housing.
8. Replace the cover.
9. Turn on the instrument and check for proper pump operation.

15 Alarms Overview

The MultiRAE MX provides an unmistakable five-way alarm notification system that combines local alarms on the device with real-time remote wireless alarm notification to take worker safety to the next level. Local alarms include audible buzzer alarm, visible alarm via bright LED lights, vibration alarm, and an alarm notification on the display. These can be programmed or selectively turned on or off.

Note: The vibration alarm is automatically disabled whenever the alkaline adapter is used.

15.1 Alarm Signals

During each measurement period, the gas concentration is compared with the programmed alarm limits for Low, High, TWA and STEL alarm. If the concentration exceeds any of the preset limits, the alarms are activated immediately to warn both the MultiRAE MX user and a remote safety officer (if wireless is enabled) of the alarm condition.

In addition, the MultiRAE MX alarms if one of the following conditions occurs: battery voltage low, pump blocked, PID lamp failed, etc.

When the low battery alarm occurs, there may be approximately 10 minutes of operating time remaining. In this case, it is recommended that you promptly change or charge the battery in a non-hazardous location.

15.2 Changing The Alarm Mode

Your choices are Auto Reset and Latched. A latched alarm stays on until you acknowledge the alarm by pressing a button. An auto-reset alarm turns off when the condition that set off the alarm is no longer present (for instance, a high H_2S reading that exceeds the preset threshold and triggers an alarm, but then lowers below that threshold, turning the alarm off).

1. Enter the Alarm Mode sub-menu of the Alarms section under the Programming Menu.
2. Select Auto Reset or Latched by pressing [N/-] to select, and [Y/+] to confirm the choice.
3. Press [Y/+] to save your selection.

15.3 Alarm Signal Summary

Hygiene Mode

Alarm Type	Buzzer & LED	Display	Vibration	Reading	Backlight	Priority
Super Alarm	4 beeps/sec	"Super Alarm" screen	400ms	-	On	Highest
Man Down Alarm	3 beeps/sec	"Man Down Alarm" screen	400ms	-	On	
Man Down Warning	2 beeps/sec	"Are you OK" screen	400ms	-	On	
Fail	3 beeps/sec	"Lamp" at PID location "Off" at LEL location	400ms	Blinking reading	On	
Pump	3 beeps/sec	Blinking pump symbol	400ms	Reading	On	
Max	3 beeps/sec	"Max" at sensor location	400ms	Blinking reading	On	
Over Range	3 beeps/sec	"Over" at sensor location	400ms	Blinking 9999	On	
High	3 beeps/sec	"High" at sensor location	400ms	Reading	On	
Low	2 beeps/sec	"Low" at sensor location	400ms	Reading	On	
Negative	1 beep/sec	"Neg" at sensor location	400ms	0	On	
STEL	1 beep/sec	"STEL" at sensor location	400ms	Reading	On	
TWA	1 beep/sec	"TWA" at sensor location	400ms	Reading	On	
Calibration Fail	1 beep/sec	"Cal" at sensor location	400ms	Reading	On	
Bump Fail	1 beep/sec	"Bump" at sensor location	400ms	Reading	On	
Datalog Full	1 beep/sec	Blinking datalog symbol	400ms	Reading	On	
Calibration Required	-	"Full" Bottle symbol	-	Reading	-	
Bump Required	-	"Empty" Bottle symbol	-	Reading	-	
Battery	1 beep/min	Blinking battery symbol	400ms	Reading	Stays as is	
Nwk Lost	1 beep/min	Blinking RF offline symbol	400ms	Reading	On	
Nwk Joined	1 beep	RF symbol with RSSI	400ms	Reading	On	
Comfort Beep	1 beep/min no LED flash	-	-	Reading	-	Lowest

Notes

"Negative" means that the reading is below zero.

"Nwk Lost" means "Network Lost." This indicates that the MuliRAE has lost wireless connectivity with its network.

"Nwk Joined" means that the MultiRAE MX has joined a wireless network.

Search Mode

Alarm Type		Buzzer & LED	Display	Vibration	Reading	Backlight	Priority
Super Alarm		4 beeps/sec	"Super Alarm" screen	400ms	-	On	Highest
Man Down Alarm		3 beeps/sec	"Man Down Alarm" screen	400ms	-	On	
Man Down Warning		2 beeps/sec	"Are You OK?" screen	400ms	-	On	
Fail		3 beeps/sec	"Off" at LEL location	400ms	Blinking reading	On	
Pump		3 beeps/sec	Blinking pump symbol	400ms	Reading	On	
Max		3 beeps/sec	"Max" at sensor location	400ms	Blinking reading	On	
Over Range		3 beeps/sec	"Over" at sensor location	400ms	Blinking 9999	On	
Geiger Counter-style Alarm	G7 (>High)	7 beeps(30ms)/sec	No change	400ms	Reading	On	
	G6	6 beeps(40ms)/sec					
	G5	5 beeps(50ms)/sec					
	G4	4 beeps(60ms)/sec					
	G3	3 beeps(70ms)/sec					
	G2	2 beeps(80ms)/sec					
	G1 (>Low)	1 beep(90ms)/sec					
Negative		1 beep/sec	"Neg" at sensor location	400ms	0	On	
STEL		1 beep/sec	"STEL" at sensor location	400ms	Reading	On	
TWA		1 beep/sec	"TWA" at sensor location	400ms	Reading	On	
Calibration Fail		1 beep/sec	"Cal" at sensor location	400ms	Reading	On	
Bump Fail		1 beep/sec	"Bump" at sensor location	400ms	Reading	On	
Datalog Full		1 beep/sec	Blinking datalog symbol	400ms	Reading	On	
Calibration Required		-	"Full" bottle symbol	-	Reading	-	
Bump Required		-	"Empty" bottle symbol	-	Reading	-	
Battery		1 beep/min	Blinking battery symbol	400ms	Reading	Stays as is	
Nwk Lost		1 beep/min	Blinking RF offline symbol	400ms	Reading	On	
Nwk Joined		1 beep	RF symbol with RSSI	400ms	Reading	On	
Comfort Beep		1 beep/min No LED flashing	-	-	Reading	-	Lowest

General Alarms

Message	Condition	Alarm Indications
HIGH	Gas exceeds "High Alarm" limit	3 beeps/flashes per second
OVR	Gas exceeds sensor's measurement range	3 beeps/flashes per second
MAX	Gas exceeds electronic circuit's maximum range	3 beeps/flashes per second
LOW	Gas exceeds "Low Alarm" limit*	2 beeps/flashes per second
TWA	Gas exceeds "TWA" limit	1 Beep/flash per second
STEL	Gas exceeds "STEL" limit	1 Beep/flash per second
Crossed pump icon flashes	Inlet blocked or pump failure	3 beeps/flashes per second
Empty battery icon flashes	Low battery	1 flash, 1 beep per minute
CAL	Calibration failed, or needs calibration	1 beep/flash per second
NEG	True sensor reading is below zero, even though a zero reading is shown for the sensor.	1 beep/flash per second

* For oxygen, "low alarm limit" means a concentration is lower than the low alarm limit.

16 Troubleshooting

Problem	Possible Reasons & Solutions
Cannot turn on power after charging the battery	**Reasons:** Defective charging circuit. Defective battery. **Solutions:** Replace battery or charger. Try charging the battery again.
Lost password	**Solutions:** Call Technical Support at +1 408-952-8461 or toll-free at +1 888-723-4800
Buzzer, LED lights, and vibration motor inoperative	**Reasons:** Buzzer and/or other alarms disabled. Bad buzzer. **Solutions:** Check under "Alarm Settings" in Programming Mode that buzzer and/or other alarms are not turned off. Call authorized service center.
"Pump failed" message. Pump alarm.	**Reasons:** Inlet probe blocked. Direct connection to a gas outlet while the gas value is turned off. External filter sucks in water. External filter too dirty. Water condensed along the inlet probe. Bad pump or pump circuit. **Solutions:** Remove the blocking objects and then press [Y/+] key to reset the pump alarm. Replace contaminated External filter. Be careful not to allow water condensation inside the unit. Replace the pump.

If you need replacement parts, a list is available online:

www.raesystems.com

17 Diagnostic Mode

In Diagnostic Mode, the MultiRAE MX provides raw counts for sensor, battery, and other readings, as well as a list of installed sensors and information about them (expiration date, serial number, etc.). Most of these screens are useful only to service technicians. A few allow access for changing settings.

The MultiRAE MX's Diagnostic Mode can only be accessed at startup time. In Diagnostic Mode, MultiRAE MX displays readings in raw counts instead of units such as parts per million (ppm).

17.1 Entering Diagnostic Mode

1. With the MultiRAE MX turned off, press and hold both [MODE] and [Y/+].
2. When the display turns on and the password screen appears, release the keys.
3. Enter the 4-digit password (the password is the same as the one for the Programming Mode; the default password is 0000):

    - Step from one position in the four-character string to the other by pressing [N/-].
    - Press [Y/+] repeatedly to select a desired number. Numbers increase from 0 to 9.
    - Once 9 is reached, pressing [Y/+] again "wraps" around back to 0.

4. When you are done, press [MODE]. If you input the correct password, you see the "Product Model" screen.

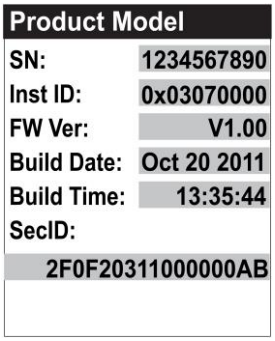
17.2 Exiting Diagnostic Mode

1. Turn off the MultiRAE MX by pressing and holding [MODE]. There will be a standard shutoff countdown.
2. When the instrument shuts off, you will be alerted. Release your finger.

Note: The next time you start MultiRAE MX, hold only [MODE], and it will automatically start in Normal Mode.

17.3 Navigating Diagnostic Mode

Step through Diagnostic Mode by pressing [MODE]. The first screen you see is information about the product, including the serial number, firmware version, etc.:



Press [MODE] to advance through the screens:

- Sensor Firmware
- ExtFlash
- Sensor Installed
- Location 1
- Location 2
- Location 3
- Location 4
- Location 5
- Socket Raw Count
- Calibration Data
- Buzzer
- Pump
- Battery
- RTC (real-time clock)
- Lights/Vibrator
- TH (Temperature and Humidity)
- LCD Contrast
- Position Sensor
- Communicate With Computer? (Datalogging And Measurement Will Pause)

18 Specifications

Instrument Specifications

Size	7.6" H x 3.8" W x 2.6" D (193 x 96.5 x 66 mm)
Weight	Pumped models: 31 oz. (880 g) Diffusion models: 26.8 oz. (760 g)
Sensor	About 25 intelligent interchangeable field-replaceable sensors, including electrochemicals for toxics and oxygen, combustible LEL, and NDIR
Battery Options	• Rechargeable Li-ion (~12 hours runtime, pumped/18 hours, diffusion; < 6 hours recharge time) • Alkaline adapter for 4 x AA batteries (~ 6 hours runtime, pumped/8 hours, diffusion)
Display	• Monochrome graphical LCD display (128 x 160) with backlighting (activated automatically in dim ambient lighting conditions, when monitor is in alarm, or with a button press) • Automatic screen flipping.
Supply Voltage Limits	3.4V DC to 4.2V DC
Maximum Power Consumption	< 1 W
Display Readout	• Real-time reading of gas concentrations; battery status; datalogging on/off; wireless on/off and reception quality. • STEL, TWA, peak, and minimum values
Keypad	1 operation and 2 programming keys (MODE, Y/+, and N/-)
Sampling	Built-in pump or diffusion. Average flow rate, pumped: 350 cc/min. Auto shutoff in low-flow conditions
Calibration	Automatic with AutoRAE 2 Test and Calibration Station or manual
Alarms	• Wireless remote alarm notification; multi-tone audible (95 dB @ 30 cm), vibration, visible (flashing bright red LEDs), and on-screen indication of alarm conditions • Man Down Alarm with pre-alarm and real-time remote wireless notification
Datalogging	• Continuous datalogging (six months for 5 sensors at 1-minute intervals, 24/7) • User-configurable datalogging interval (from 1 to 3,600 seconds)
Communication and Data Download	• Data download and instrument setup on PC via Travel Charger or AutoRAE 2 Automated Test and Calibration Station • Wireless data and status transmission via built-in RF modem (optional)
Wireless Network	RAE Systems Dedicated Wireless Network
Wireless Frequency	ISM license-free bands
Wireless Range (Typical)	656 feet (200 meters)

Instrument Specifications *continued*	
EM Immunity	No effect when exposed to 0.43mW/cm^2 RF interference (5-watt transmitter at 12")
Operating Temperature	-4° to 122° F (-20° to 50° C)
Pressure limits	80kPa to 120kPa
Humidity	0% to 95% relative humidity (non-condensing)
Dust and Water Resistance	IP-65 (pumped), IP-67 (diffusion)
Hazardous Location Approvals	Exia Class I, Division 1, Groups A, B, C, D, T4 SIRA 11ATEX2152X, CE 0575 Ex II 2G Ex ia d IIC T4 Gb UM=20V IECEx SIR 11.0069X, Ex ia d IIC T4 Gb
CE Compliance (European Conformity)	EMC directive: 2004/108/EC R&TTE directive: 1999/5/EC ATEX directive: 94/9/EC
MED Compliance (Wheelmark)	MED directive: 96/98/EC and amending directive (8th) 2012/32/EU
FCC Compliance	FCC Part 15
Performance Tests	LEL CSA C22.2 No. 152; ISA-12.13.01 ATEX performance, combustible gases: FTZU 13 ATEX 0196X, EN60079-29-1:2007 and EN 50271:2010 Performance, Toxic gases and Oxygen: FTZU 14 EX 0008, EN 45544-1-2-3: 1999, EN 50104:2010 and EN 50271:2010
Languages	Arabic, Chinese, Czech, Danish, Dutch, English, French, German, Indonesian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, and Swedish
Warranty	• Two years on non-consumable components and catalytic LEL, H_2S, and O_2 sensors • One year on CO 2000 and all other sensors, battery, and other consumable parts
Specifications are subject to change.	

18.1 Sensor Specifications

Sensor stabilization time: 24 hours (new sensor), 2 minutes (warmed-up sensor)

Combustible Sensors	Range	Resolution
Catalytic bead LEL * ** NDIR (0-100% Vol. Propane) * **	0 to 100% LEL 0 to 100% Vol	1% LEL 0.1% Vol
Electrochemical Sensors	**Range**	**Resolution**
Ammonia (NH_3)	0 to 100 ppm	1 ppm
Carbon Monoxide (CO) Carbon Monoxide (CO), Ext. Range* Carbon Monoxide (CO), H_2-comp. Carbon Monoxide (CO) + Hydrogen Sulfide (H_2S) Combo	0 to 500 ppm 0 to 2,000 ppm 0 to 2,000 ppm 0 to 500 ppm 0 to 200 ppm	1 ppm 10 ppm 10 ppm 1 ppm 0.1 ppm
Chlorine (Cl_2)	0 to 50 ppm	0.1 ppm
Chlorine Dioxide (ClO_2)	0 to 1 ppm	0.03 ppm
Ethylene Oxide (EtO-A) Ethylene Oxide (EtO-B) Ethylene Oxide (EtO-C), Ext. Range***	0 to 100 ppm 0 to 10 ppm 0 to 500 ppm	0.5 ppm 0.1 ppm 10 ppm
Formaldehyde (HCHO)	0 to 10 ppm	0.05 ppm
Hydrogen (H_2)***	0 to 1,000 ppm	2 ppm
Hydrogen Cyanide (HCN)	0 to 50 ppm	0.5 ppm
Hydrogen Sulfide (H_2S)*	0 to 100 ppm	0.1 ppm
Hydrogen Sulfide (H_2S), Ext. Range	0 to 1,000 ppm	1 ppm
Methyl Mercaptan (CH_3-SH)	0 to 10 ppm	0.1 ppm
Nitric Oxide (NO)	0 to 250 ppm	0.5 ppm
Nitrogen Dioxide (NO_2)	0 to 20 ppm	0.1 ppm
Oxygen (liquid)* **	0 to 30% Vol.	0.1% Vol.
Phosphine (PH_3)	0 to 20 ppm	0.1 ppm
Sulfur Dioxide (SO_2)	0 to 20 ppm	0.1 ppm

All specifications are subject to change without notice.

* ATEX performance tested in the MultiRAE MX.
** Wheelmark tested in the MultiRAE MX.
*** Supported in MultiRAE MX diffusion version only.

18.2 Range, Resolution & Response Time

Sensor	Range	Resolution	Response Time
LEL	0 to 100%	1%	15 sec

18.3 LEL Correction Factors

Chemical	100% LEL (Vol%)	LEL CF*
Acetaldehyde	4	*1.7*
Acetic acid	4	*2.5*
Acetic Anhydride	2.7	*2.7*
Acetone	2.5	*1.9*
Acetonitrile	3	**1.7**
Acetylene	2.5	**2.9**
Allyl Alcohol	2.5	*2.1*
Ammonia	15	*1.0*
Aniline	1.3	*6.3*
Benzene	1.2	**2.1**
Butadiene, 1, 3-	2	*1.8*
Butane, i-	1.8	**1.7**
Butane, n-	1.9	*1.9*
Butanol, i-	1.7	*2.3*
Butanol, n-	1.4	**2.8**
Butanol, t-	2.4	*2.2*
Butene-1	1.6	*1.9*
Butene-2, cis	1.7	*1.9*
Butene-2, trans	1.8	*1.9*
Butyric acid	2	*3.7*
Carbon monoxide	12.5	*1.3*
Carbonyl sulfide	12	*1.9*
Chlorobenzene	1.3	**3.7**
Chloropropane, 1-	2.6	*2.2*
Cyanogen	6.6	*1.8*
Cyclohexane	1.3	**2.1**
Cyclopropane	2.4	*1.6*
Decane, n-	0.8	*3.3*
Dichloroethane, 1,2-	6.2	**5.4**
Dichloromethane	13	*2.3*
Diisobutyl ketone	0.8	*3.2*
Dimethyl sulfide	2.2	*2.0*
Dimethylbutane	1.2	*2.3*
Dimethylpentane, 2,3-	1.1	*2.5*
Dioxane, 1,4-	2	*2.4*
Ethane	3	*1.4*
Ethanol	3.3	*1.8*
Ethene	2.7	*1.3*
Ethyl acetate	2	*2.4*

Chemical	100% LEL (Vol%)	LEL CF*
Ethyl benzene	0.8	*2.7*
Ethyl bromide	6.8	*2.6*
Ethyl chloride	3.8	*2.0*
Ethyl ether	1.9	*2.2*
Ethylamine	3.5	*1.7*
Ethyl formate	2.8	*2.2*
Ethyl mercaptan	2.8	*2.0*
Ethyl methyl ether	2	*1.9*
Ethyl pentane	1.2	*2.8*
Ethylene oxide	3	*1.7*
Gasoline,	1.3	*2.6*
Heptane, n-	1.1	*2.5*
Hexadiene, 1,4-	2	*2.3*
Hexane, n-	1.1	**2.1**
Hydrazine	2.9	*4.7*
Hydrogen	4	**1.0**
Hydrogen cyanide	5.6	**1.6**
Isobutene (Isobutylene)	1.8	**1.6**
Isopropanol	2	**2.2**
Methane	5	**1.0**
Methanol	6	**1.6**
Methyl acetate	3.1	*2.2*
Methylamine	4.9	*1.4*
Methyl bromide	10	*2.4*
Methyl chloride	8.1	*1.8*
Methyl ether	3.4	*1.7*
Methyl ethyl ketone	1.4	**2.2**
Methyl formate	4.5	*1.9*
Methyl hexane	1.2	*2.5*
Methyl mercaptan	3.9	*1.7*
Methyl n-propyl ketone	1.2	*2.4*
Methyl propionate	2.5	*2.4*
Methylcyclohexane	1.2	*2.5*
Methylpentane	1.2	*2.3*
Napthalene	0.9	*6.5*
Nitromethane	7.3	*2.1*
Nonane, n-	0.8	*3.0*
Octane, n-	1	*2.7*
Pentane, n-	1.5	*2.1*
Pentane, i-	1.4	**1.9**
Pentane, Neo-	1.4	*2.1*
Phosphine	1.6	*1.5*
Propane	2.1	**1.4**
Propanol, n-	2.2	*2.1*
Propene	2	*1.6*
Propyl ether, iso-	1.4	*2.5*

Chemical	100% LEL (Vol%)	LEL CF*
Propylamine, n-	2	*1.9*
Propylene oxide	2.3	*1.9*
Propyne	1.7	*1.6*
Toluene	1.1	*2.4*
Triethylamine	1.2	*2.5*
Trimethylamine	2	*1.9*
Trimethylbutane	1.2	*2.5*
Turpentine	0.8	*3.0*
Vinyl chloride	3.6	*2.0*
Xylene, m-	1.1	*2.7*
Xylene, o-	0.9	*2.8*
Xylene, p-	1.1	**2.9**

* Values in **bold** type are confirmed with RAE Systems instruments. Others are calculated from diffusion models for LEL sensors. For the most accurate measurements, the instrument should be calibrated with the gas under investigation. See RAE Systems Technical Note TN-156 for more details and other compounds.

Note: Reported values of the lower explosive limit for jet fuels range from about 0.3% to 0.9% by volume. An earlier third-party test reported a CF for jet fuels of 3.35. However, we have been unable to confirm this result and recommend using a PID as a much more accurate method of measuring LEL for jet and diesel fuels.

Caution:
Refer to RAE Systems Technical Note TN-144 for LEL sensor poisoning.

Year of Manufacture

To identify the year of manufacture, refer to the serial number of the instrument.

The second to last digit in the serial number indicates the year of manufacture. For example, "M" indicates the manufacturing year is 2010.

First digit	Year
J	2008
K	2009
M	2010
N	2011
P	2012
Q	2013
R	2014
S	2015
T	2016
U	2017
V	2018
W	2019

19 Technical Support

To contact RAE Systems Technical Support Team:

Monday through Friday, 7:00AM to 5:00PM Pacific (US) Time
Phone (toll-free): +1 888-723-4800
Phone: +1 408-952-8461
Email: tech@raesystems.com

EMEAI Support

Email: haexpert@honeywell.com

20 RAE Systems Contacts

RAE Systems by Honeywell
World Headquarters
3775 N. First St.
San Jose, CA 95134-1708 USA
Phone: +1 408.952.8200
Fax: +1 408.952.8480

E-mail: customerserv@raesystems.com
Web Site: www.raesystems.com

RAE Systems Technical Support
Monday through Friday, 7:00AM to 5:00PM Pacific Time
Phone: +1.408.952.8461
Email: tech@raesystems.com

Honeywell Analytics
4 Stinsford Road
Poole BH17 0RZ
United Kingdom
Phone: +44 (0)1202 645564
Fax: +44 (0)1202 678011
Email: haexpert@honeywell.com

RAE Systems France
ZI des Ayats
679390 MILLERY
France
Phone: +33 4 78 46 16 65
Fax: +33 4 78 46 25 98
Email: info-france@raeeurope.com
Web: www.raesystems.fr

RAE BeNeLux BV
Hoofdweg 34C
2908 LC Capelle a/d IJssel
The Netherlands
Phone: +31 10 4426149
Fax: +31 10 4426148
Email: info@rae.nl
Web: www.rae.nl

RAE Systems Spain, s.l.
Av. Remolar, 31
08820 El Prat de Llobregat
Spain
Phone: +34 933 788 352
Fax: +34 933 788 353
Mobile: +34 687 491 106
Email: mdelgado@raespain.com
Web: www.raespain.com

RAE Systems Germany GmbH
Felix-Wankel-Str. 5
82152 Krailing, Germany
Phone: +49 89 20 70 40 248
Fax: +49 89 850 93 74
Email: orders@raeeurope.com

RAE Systems (Hong Kong) Ltd.
Room 8, 6/F, Hong Leong Plaza
33 Lok Yip Road
Fanling, N.T, Hong Kong
Phone: +852.2669.0828
Fax: +852.2669.0803
Email: hksales@raesystems.com

RAE Systems Japan
Marunouchi Nakadori Bldg 6F-617-B,
2-3, Marunouchi 2-Chome, Chiyoda-ku,
Tokyo, 100-0005 Japan
Phone: +81-3-6269-9646
Fax: +81-3-6269-9647
Email: jpsales@raesystems.com

RAE Systems Korea
#1010, DaeMyungAnsVill First,
Sang-Dong 412-2, Wonmi-Gu, Bucheon,
Kyungki-Do, Korea
Phone: 82-32-328-7123
Fax: 82-32-328-7127
Email: krsales@raesystems.com

RAE Systems by Honeywell Brazil Office
Av. Marginal da Rodovia dos Bandeirantes, 100 Jundiaí - SP
13213-008 Brazil
Telefone: +55.11.3309.1030
Fax: +55.11.3309.1035
E-mail: HALA@honeywell.com
Web: www.raesystems.com.br

RAE Systems by Honeywell
World Headquarters
3775 N. First St.
San Jose, CA 95134-1708 USA
Phone: 408.952.8200
Fax: 408.952.8480

E-mail: customerserv@raesystems.com
Web Site: www.raesystems.com

Rev A
October 2014
P/N: M01-4035-000